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Hendrickson et al.

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(54) **VIDEO CONFERENCE SERVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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(51) **Int. Cl.**

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H04N 7/15	(2006.01)
H04L 12/18	(2006.01)

(52) **U.S. Cl.**

CPC ***H04L 65/1069*** (2013.01); ***H04L 12/1818*** (2013.01); ***H04L 65/1073*** (2013.01); ***H04L 65/403*** (2013.01); ***H04N 7/15*** (2013.01)

(58) **Field of Classification Search**

CPC H04L 12/1818; H04L 65/1069; H04L 65/1073; H04L 65/403; H04N 7/15

USPC 348/14.03, 14.08, 14.07; 379/202.01; 709/204; 726/1; 370/260, 261; 455/519

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,598,209 A * 1/1997 Cortjens H04N 5/23203 348/14.05

5,619,555 A 4/1997 Fenton et al.

(Continued)

OTHER PUBLICATIONS

"Authenticating Devices—Cisco TelePresence Deployment Guide", Cisco Systems, Inc., Cisco VCS X6.1, May 2011, 24 pages.

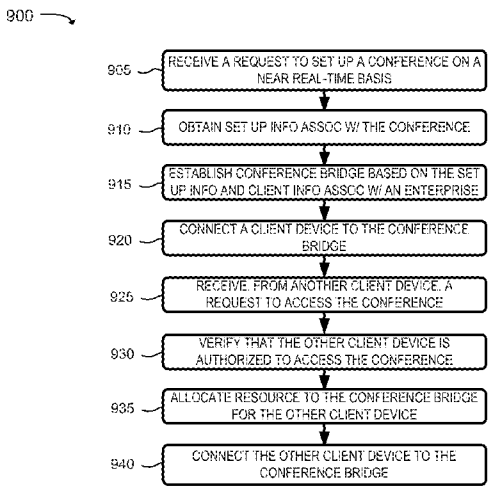
(Continued)

Primary Examiner — Gerald Gauthier

(57) **ABSTRACT**

A system is configured to receive a request to set up a first video conference and another request to set up a second video conference, where the request is received from a client device and where the other request is received from another client device; obtain first information associated with an enterprise with which the client device is associated and second information associated with another, different enterprise with which the other client device is associated; determine whether the first information permits the client device to set up the first video conference and whether the second information permits the other client device to set up the second video conference; establish the first video conference when the first information permits the client device to set up the first video conference; and establish the second video conference when the second information permits the other client device to set up the second video conference.

20 Claims, 9 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

5,745,161	A *	4/1998	Ito	H04N 7/15 348/14.09
5,745,711	A	4/1998	Kitahara et al.	
6,466,252	B1 *	10/2002	Miyazaki	H04N 7/15 348/14.08
6,876,734	B1	4/2005	Summers et al.	
7,046,779	B2 *	5/2006	Hesse	H04L 12/1818 348/E7.084
7,353,251	B1	4/2008	Balakrishnan	
7,716,283	B2 *	5/2010	Thukral	H04N 7/15 709/204
7,747,270	B2 *	6/2010	Schwagmann	H04W 4/10 370/266
8,064,368	B1 *	11/2011	Jones	H04L 12/1827 370/260
8,200,756	B2 *	6/2012	Karniely	H04M 3/562 709/204
8,411,129	B2 *	4/2013	Satterlee	H04N 7/152 348/14.08
8,471,889	B1 *	6/2013	Lee	H04N 7/15 348/14.07
8,526,587	B2 *	9/2013	Uhler	H04M 3/56 379/158
8,736,661	B2	5/2014	Koh et al.	
8,860,777	B2 *	10/2014	Hendrickson	H04L 12/1818 348/14.07
8,880,598	B2 *	11/2014	Sekaran	H04L 12/1822 709/204
9,082,297	B2 *	7/2015	Alexander	G08C 23/04
2004/0119814	A1 *	6/2004	Clisham	H04N 7/141 348/14.08
2009/0147705	A1 *	6/2009	Kowalewski	H04M 3/56 370/261
2013/0127979	A1	5/2013	Koh et al.	
2013/0152153	A1 *	6/2013	Weiser	H04L 63/0236 726/1
2013/0162753	A1 *	6/2013	Hendrickson	H04L 12/1818 348/14.08
2014/0198173	A1 *	7/2014	Willig	H04N 7/15 348/14.03
2015/0029302	A1 *	1/2015	Hendrickson	H04L 12/1818 348/14.08

OTHER PUBLICATIONS

"Basic Cisco VCS configuration TelePresence Deployment Guide", Cisco Systems, Inc., Cisco VCS Control with Cisco VCS Expressway X5.2, Nov. 2010, 44 pages.

"Cisco TelePresence—TelePresence Server 8710 and 7010", Cisco Systems, Inc., Version 2.2, Product user guide, Jun. 2011, 151 pages.

"Cisco TelePresence Management Suite", Cisco Systems, Inc., Release note, Jan. 2011, 25 pages.

"Cisco TelePresence Management Suite Administration Guide", Cisco Systems, Inc., Dec. 2010, 37 pages.

"Cisco TelePresence Management Suite Installation and Getting Started guide", Cisco Systems, Inc., Jan. 2011, 69 pages.

"Cisco TelePresence MCU 4500 Series MSE 8510 Media blade", Cisco Systems, Inc., Online Help, Software Version 4.1, Oct. 2010, 238 pages.

"Cisco TelePresence Server—Cisco TelePresence Server MSE 8710; Cisco TelePresence Server 7010", Cisco Systems, Inc., Version 2.2(1.43), Software Release notes, Aug. 2011, 21 pages.

"Cisco Telepresence System Codec C-Series", Cisco Systems, Inc., Software release notes TC4, Feb. 2011, 53 pages.

"Cisco TelePresence Video Communication Server—Getting Started", Cisco Systems, Inc., Dec. 2010, 12 pages.

"Cisco TelePresence Video Communication Server (Cisco VCS) IP port usage for firewall traversal", Cisco Systems, Inc., Sep. 2011, 28 pages.

"Cisco TelePresence Video Communication Server Administrator Guide", Cisco Systems, Inc., Software Version X6.1, Apr. 2011, 401 pages.

"Cisco TelePresence Video Communication Server X6.1", Cisco Systems, Inc., Software release notes, Apr. 2011, 26 pages.

"Cisco TMS Provisioning Deployment Guide", Cisco Systems, Inc., Jan. 2011, 47 pages.

"Cisco Unified Communication Manager", Cisco Systems, Inc., Versions v6.1, 7 and 8, Cisco TelePresence Deployment Guide, Cisco VCS X6, SIP trunk, Jun. 2011, 49 pages.

"Cluster creation and maintenance—Cisco TelePresence Deployment Guide", Cisco Systems, Inc., Cisco VCS X5, Oct. 2010, 72 pages.

"Cluster Creation and Maintenance—Cisco TelePresence Deployment Guide", Cisco Systems, Inc., Cisco VCS X6.1, May 2011, 68 pages.

"Tandberg Codian Supervisor help contents", Tandberg Products UK Ltd., 2003-2010, 75 pages.

"Tandberg H.323", Tandberg, Mar. 2010, 119 pages.

"Total TelePresence", Cisco Systems, Inc., Version 4.0.0, Release notes, Nov. 2010, 3 pages.

Tandberg, "Knowledge Base Article 114—What are the SMNP System OIDs for TANDBERG Codian products?", retrieved from Internet archive Aug. 25, 2010, 1 page.

Tandberg, "Know Base Article 67—Which SNMP MIBs do codian products support?", retrieved from internet archive Aug. 25, 2010, 2 pages.

Tandberg, "Knowledge Base", 2010, retrieved from Internet archive, Feb. 27, 2010, 2 pages.

Tandberg, "Online Support", retrieved from internet archive, Oct. 27, 2010, 1 page.

Tandberg, "Tandberg Codian MSE 8000 Series", Oct. 2004, 2 pages.

Tandberg, "Tandberg Codian MSE 8050 Supervisor", Version 2.1(1.18) Software release notes, Jul. 2010, 7 pages.

Tandberg, "Tandberg Codian: MCU 4200 Series; MCU 4500 Series; MSE 8420 Media blade; MSE 8510 Medial blade", Version 4.1 (1.51), Software release notes, Sep. 2010, 16 pages.

Tandberg, "Tandberg Management Suite", Jul. 2004, 2 pages.

Tandberg, "Tandberg Video Communication Server Control Application", Feb. 2009, 2 pages.

Tandberg, "Tandberg Video Communication Server Expressway Application", Mar. 2008, 2 pages.

Cisco Systems, Inc., "Cisco TelePresence MCU 4500 Series MSE 8510 Media blade", Online Help, Software Version 4.1, Oct. 2010, 238 pages.

Tandberg Products UK Ltd., "Tandberg Codian Supervisor help contents", 2003-2010, 75 pages.

Cisco Systems, Inc., "Cisco Telepresence System Codec C-Series", Software release notes TC4, Feb. 2011, 53 pages.

Tandberg, "Tandberg Codian: MCU 4200 Series; MCU 4500 Series; MSE 8420 Media blade; MSE 8510 Media2 blade", Version 4.1(1.51), Software release notes, Sep. 2010, 16 pages.

Cisco Systems, Inc., "Total TelePresence" Version 4.0.0, Release notes, Nov. 2010, 3 pages.

Cisco Systems, Inc., "Cisco TelePresence Server—Cisco TelePresence Server MSE 8710; Cisco TelePresence Server 7010", Version 2.2(1.43), Software Release notes, Aug. 2011, 21 pages.

Cisco Systems, Inc., "Cisco TMS Provisioning Deployment Guide", Jan. 2011, 47 pages.

Cisco Systems, Inc., "Cisco TelePresence Video Communication Server (Cisco VCS) IP port usage for firewall traversal", Sep. 2011, 28 pages.

Tandberg, "Tandberg H.323", Mar. 2010, 119 pages.

Cisco Systems, Inc., "Cluster creation and maintenance—Cisco TelePresence Deployment Guide", Cisco VCS X5, Oct. 2010, 72 pages.

Cisco Systems, Inc., "Cisco TelePresence—TelePresence Server 8710 and 7010", Version 2.2, Product user guide, Jun. 2011, 151 pages.

Cisco Systems, Inc., "Basic Cisco VCS configuration TelePresence Deployment Guide", Cisco VCS Control with Cisco VCS Expressway X5.2, Nov. 2010, 44 pages.

Cisco Systems, Inc., "Cisco TelePresence Video Communication Server X6.1" Software release notes, Apr. 2011, 26 pages.

Cisco Systems, Inc., "Cisco TelePresence Video Communication Server—Getting Started", Dec. 2010, 12 pages.

(56) **References Cited**

OTHER PUBLICATIONS

Cisco Systems, Inc., "Cluster Creation and Maintenance—Cisco TelePresence Deployment Guide", Cisco VCS X6.1, May 2011, 68 pages.

Cisco Systems, Inc., "Cisco Unified Communication Manager", Versions v6.1, 7 and 8, Cisco TelePresence Deployment Guide, Cisco VCS X6, SIP trunk, Jun. 2011, 49 pages.

Cisco Systems, Inc., "Authenticating Devices—Cisco TelePresence Deployment Guide", Cisco VCS X6.1, May 2011, 24 pages.

Cisco Systems, Inc., "Cisco TelePresence Video Communication Server Administrator Guide", Software Version X6.1, Apr. 2011, 401 pages.

Cisco Systems, Inc., "Cisco TelePresence Management Suite" Release note, Jan. 2011, 25 pages.

Cisco Systems, Inc., "Cisco TelePresence Management Suite Installation and Getting Started guide", Jan. 2011, 69 pages.

Cisco Systems, Inc., "Cisco TelePresence Management Suite Administration Guide", Dec. 2010, 37 pages.

* cited by examiner

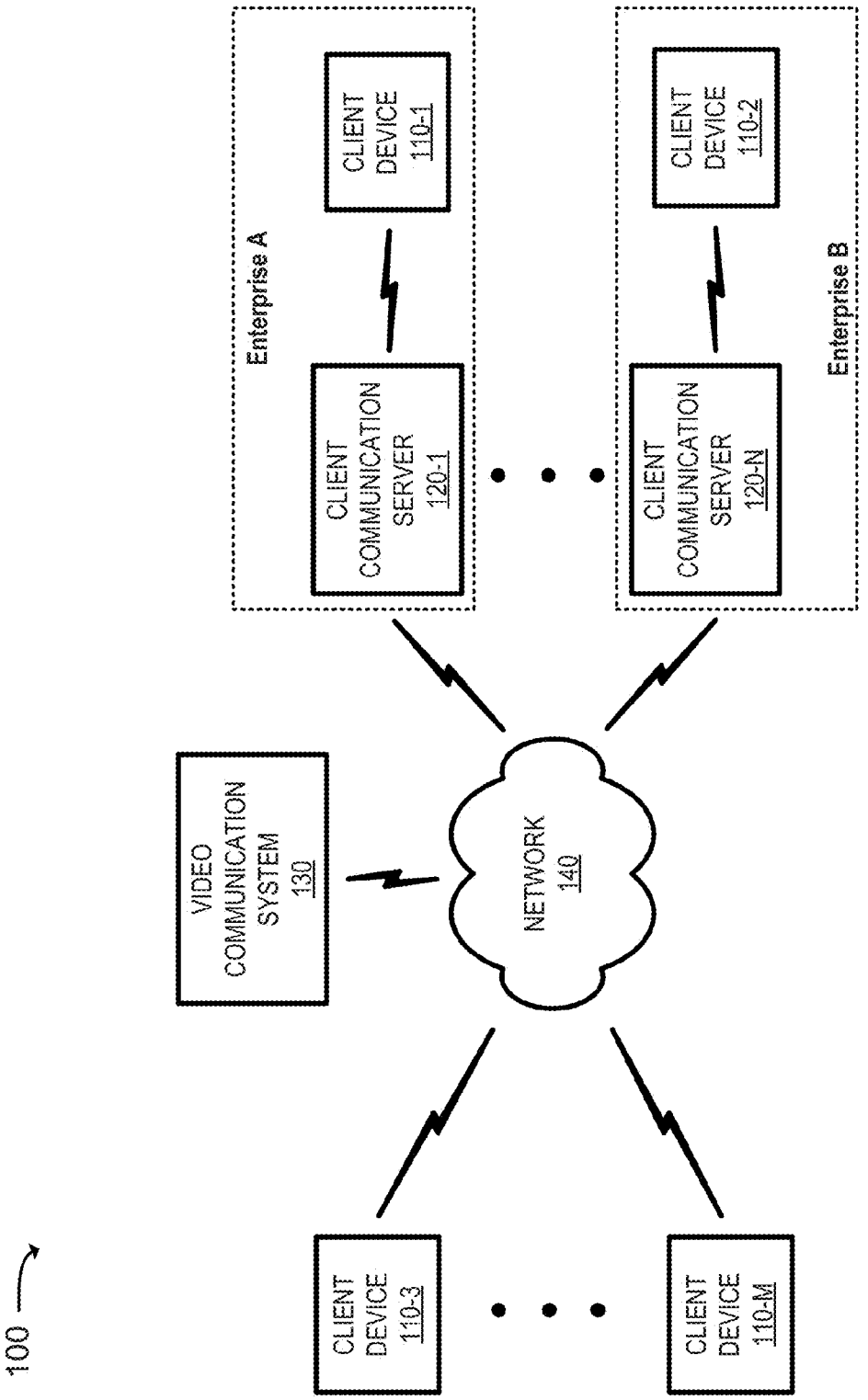

100
Enterprise A
CLIENT DEVICE 110-1
CLIENT COMMUNICATION SERVER 120-1
Enterprise B
CLIENT DEVICE 110-2
CLIENT COMMUNICATION SERVER 120-N
VIDEO COMMUNICATION SYSTEM 130
NETWORK 140
CLIENT DEVICE 110-3
CLIENT DEVICE 110-M

FIG. 1

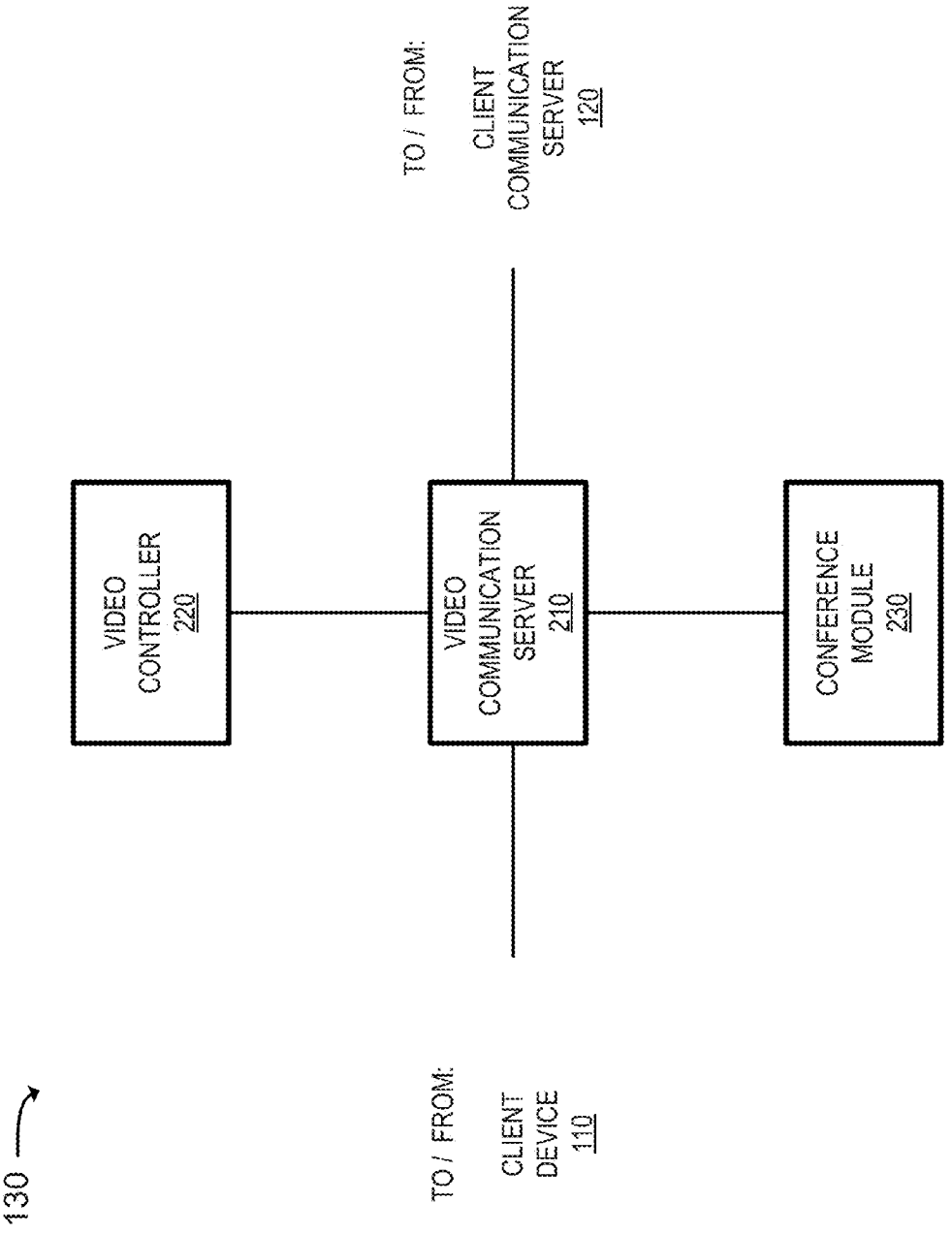

130
TO / FROM:
CLIENT DEVICE 110
VIDEO CONTROLLER 220
VIDEO COMMUNICATION SERVER 210
CONFERENCE MODULE 230
TO / FROM:
CLIENT COMMUNICATION SERVER 120

FIG. 2

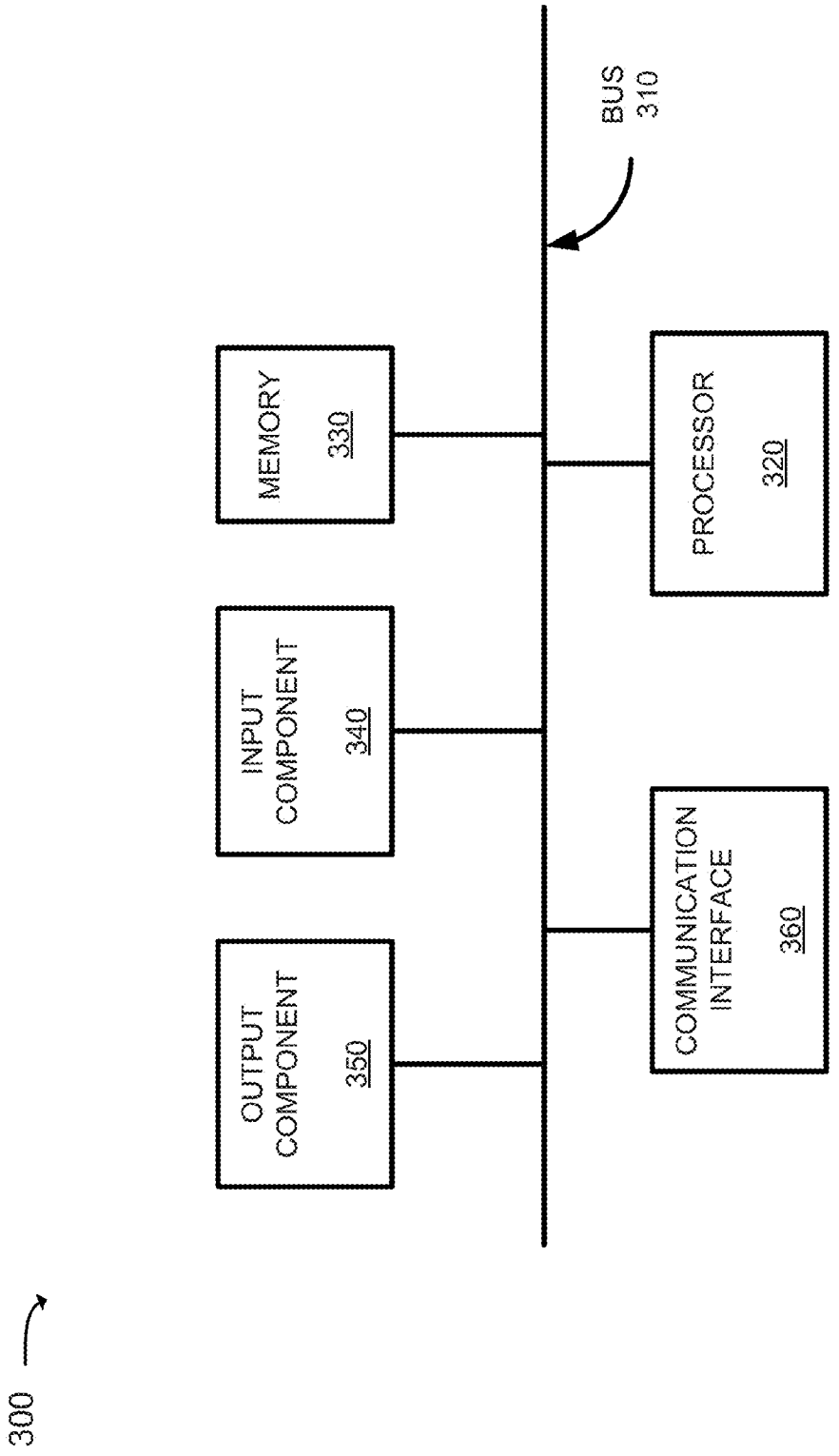

300
BUS
310
MEMORY
330
PROCESSOR
320
INPUT
COMPONENT
340
COMMUNICATION
INTERFACE
360
OUTPUT
COMPONENT
350

FIG. 3

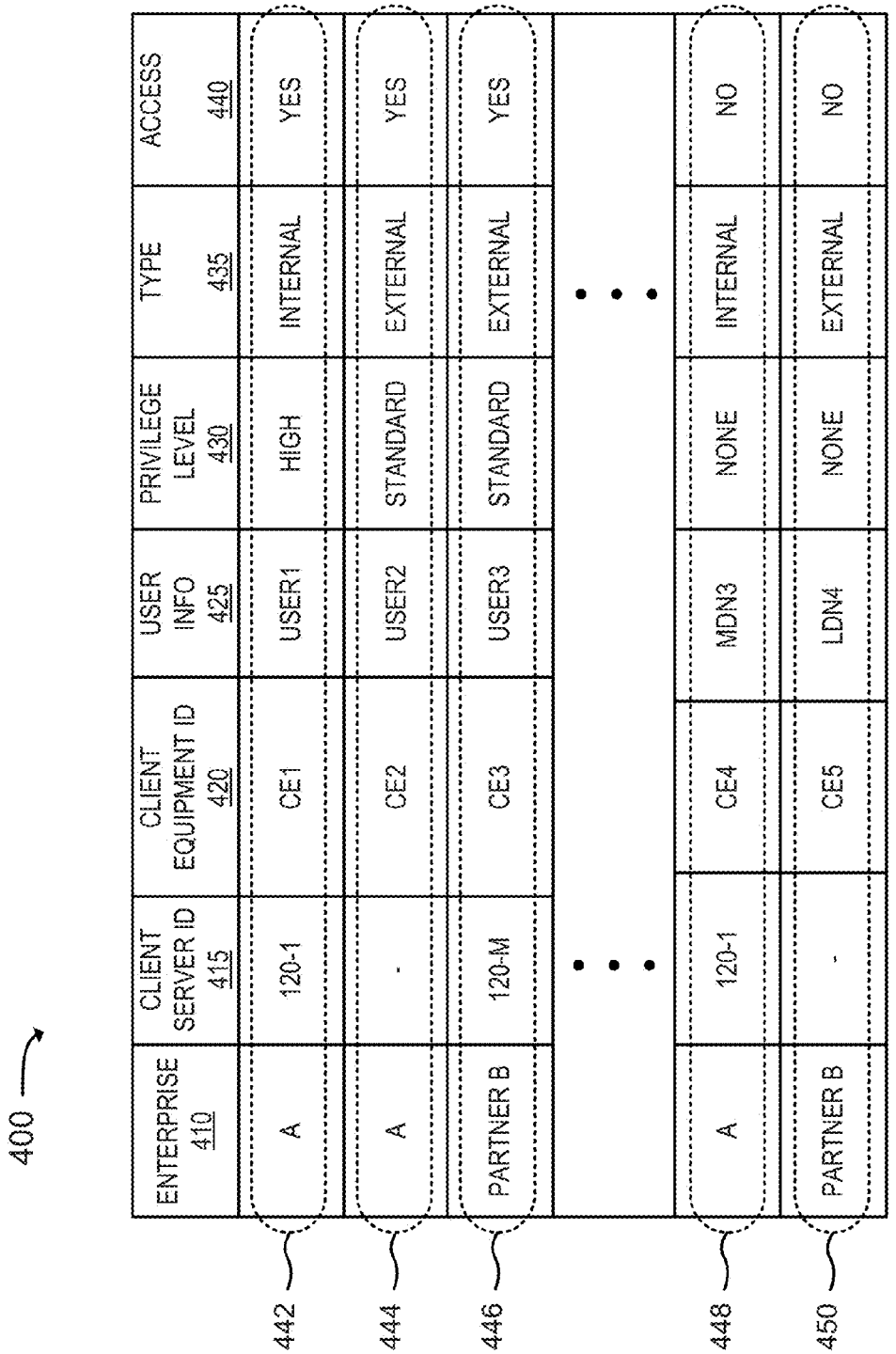

400
ENTERPRISE 410
CLIENT SERVER ID 415
CLIENT EQUIPMENT ID 420
USER INFO 425
PRIVILEGE LEVEL 430
TYPE 435
ACCESS 440
A
120-1
CE1
USER1
HIGH
INTERNAL
YES
442
A
-
CE2
USER2
STANDARD
EXTERNAL
YES
444
PARTNER B
120-M
CE3
USER3
STANDARD
EXTERNAL
YES
446
A
120-1
CE4
MDN3
NONE
INTERNAL
NO
448
PARTNER B
-
CE5
LDN4
NONE
EXTERNAL
NO
450

FIG. 4

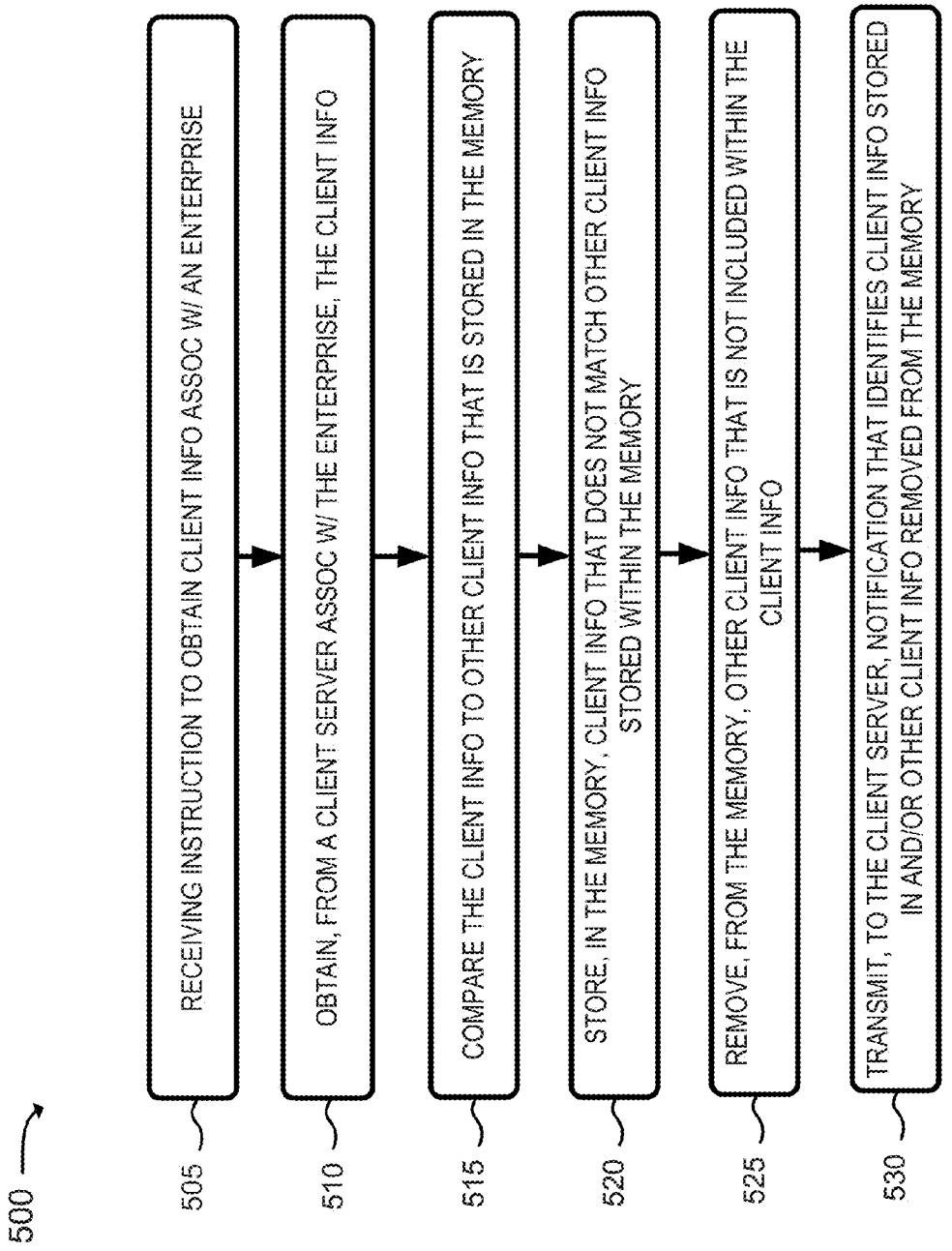

500
505
RECEIVING INSTRUCTION TO OBTAIN CLIENT INFO ASSOC W/ AN ENTERPRISE
510
OBTAIN, FROM A CLIENT SERVER ASSOC W/ THE ENTERPRISE, THE CLIENT INFO
515
COMPARE THE CLIENT INFO TO OTHER CLIENT INFO THAT IS STORED IN THE MEMORY
520
STORE, IN THE MEMORY, CLIENT INFO THAT DOES NOT MATCH OTHER CLIENT INFO STORED WITHIN THE MEMORY
525
REMOVE, FROM THE MEMORY, OTHER CLIENT INFO THAT IS NOT INCLUDED WITHIN THE CLIENT INFO
530
TRANSMIT, TO THE CLIENT SERVER, NOTIFICATION THAT IDENTIFIES CLIENT INFO STORED IN AND/OR OTHER CLIENT INFO REMOVED FROM THE MEMORY

FIG. 5

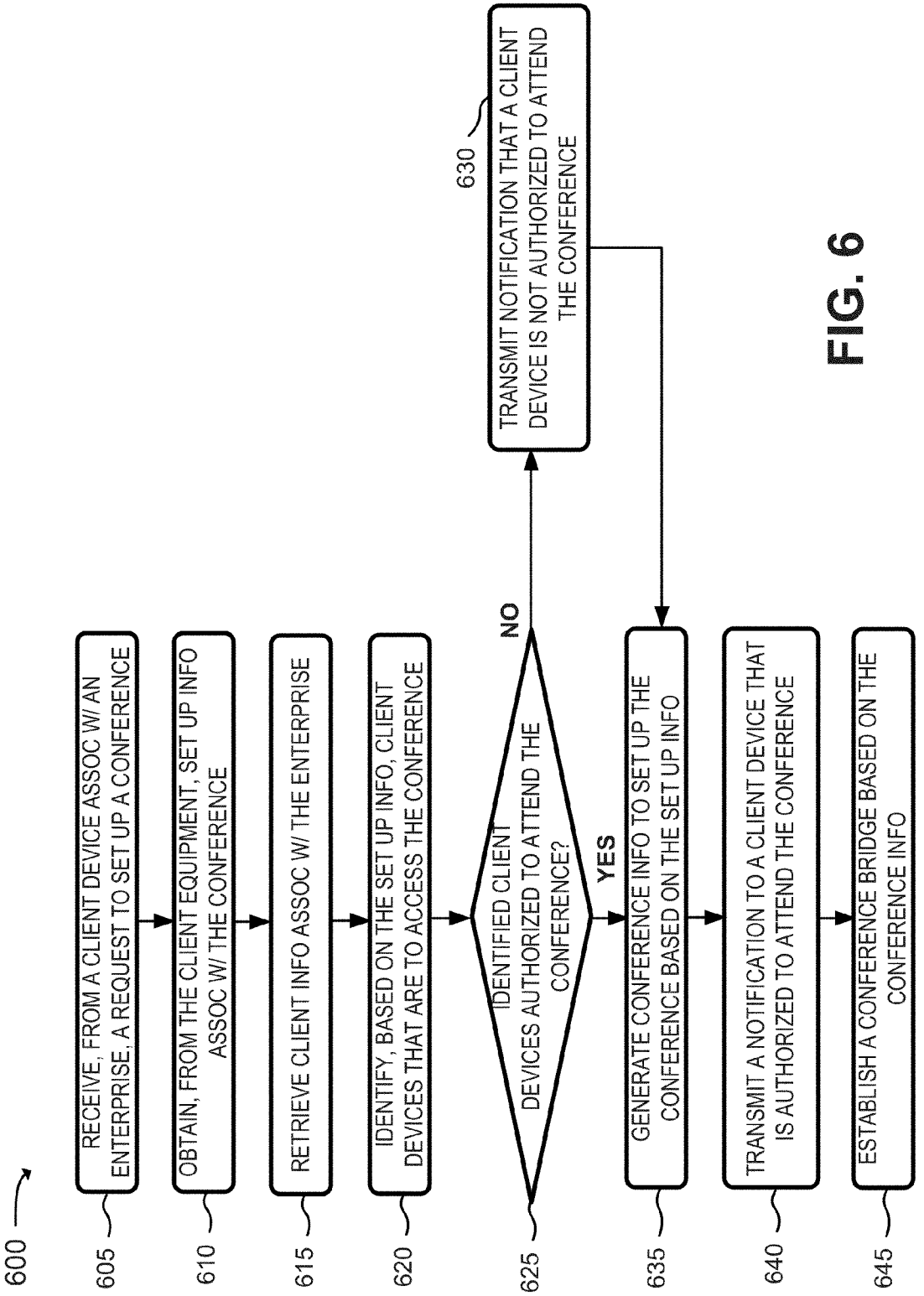

600
605
RECEIVE, FROM A CLIENT DEVICE ASSOC W/ AN ENTERPRISE, A REQUEST TO SET UP A CONFERENCE
610
OBTAIN, FROM THE CLIENT EQUIPMENT, SET UP INFO ASSOC W/ THE CONFERENCE
615
RETRIEVE CLIENT INFO ASSOC W/ THE ENTERPRISE
620
IDENTIFY, BASED ON THE SET UP INFO, CLIENT DEVICES THAT ARE TO ACCESS THE CONFERENCE
625
IDENTIFIED CLIENT DEVICES AUTHORIZED TO ATTEND THE CONFERENCE?
NO
630
TRANSMIT NOTIFICATION THAT A CLIENT DEVICE IS NOT AUTHORIZED TO ATTEND THE CONFERENCE
YES
635
GENERATE CONFERENCE INFO TO SET UP THE CONFERENCE BASED ON THE SET UP INFO
640
TRANSMIT A NOTIFICATION TO A CLIENT DEVICE THAT IS AUTHORIZED TO ATTEND THE CONFERENCE
645
ESTABLISH A CONFERENCE BRIDGE BASED ON THE CONFERENCE INFO

FIG. 6

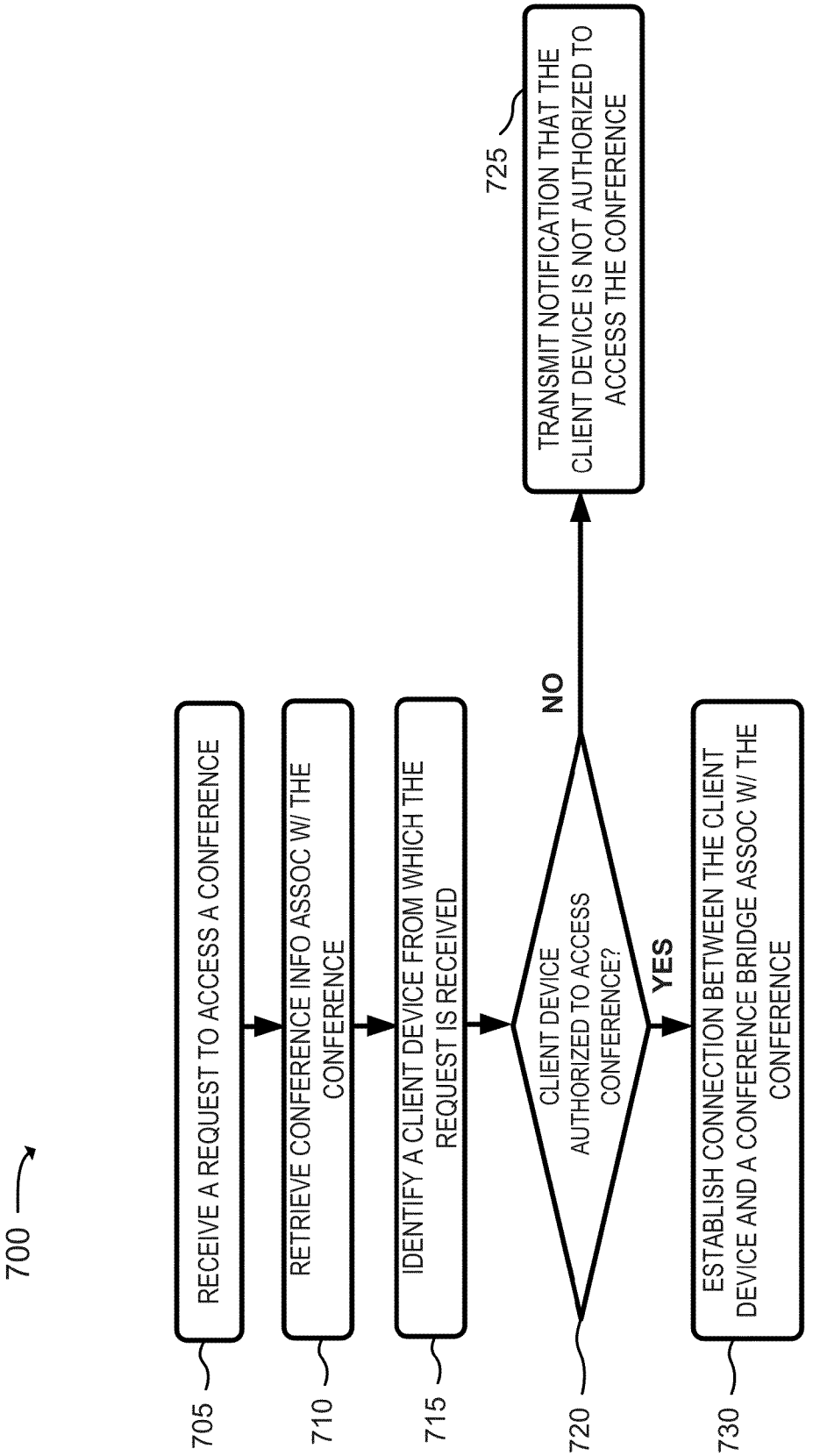

700
RECEIVE A REQUEST TO ACCESS A CONFERENCE
705
RETRIEVE CONFERENCE INFO ASSOC W/ THE CONFERENCE
710
IDENTIFY A CLIENT DEVICE FROM WHICH THE REQUEST IS RECEIVED
715
CLIENT DEVICE AUTHORIZED TO ACCESS CONFERENCE?
720
NO
YES
TRANSMIT NOTIFICATION THAT THE CLIENT DEVICE IS NOT AUTHORIZED TO ACCESS THE CONFERENCE
725
ESTABLISH CONNECTION BETWEEN THE CLIENT DEVICE AND A CONFERENCE BRIDGE ASSOC W/ THE CONFERENCE
730

FIG. 7

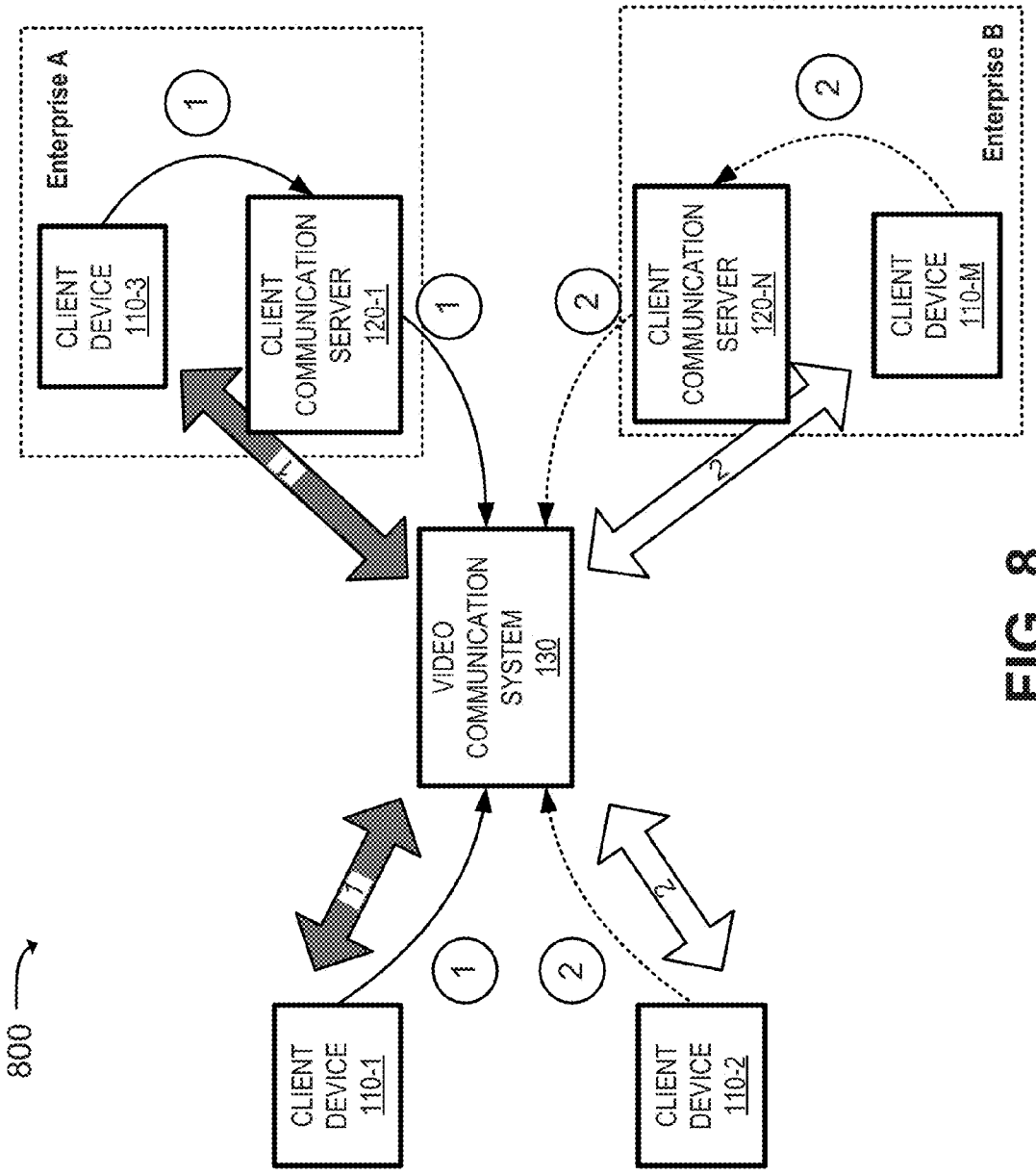

800
Enterprise A
CLIENT DEVICE 110-3
CLIENT COMMUNICATION SERVER 120-1
Enterprise B
CLIENT COMMUNICATION SERVER 120-N
CLIENT DEVICE 110-M
VIDEO COMMUNICATION SYSTEM 130
CLIENT DEVICE 110-1
CLIENT DEVICE 110-2
1
2

FIG. 8

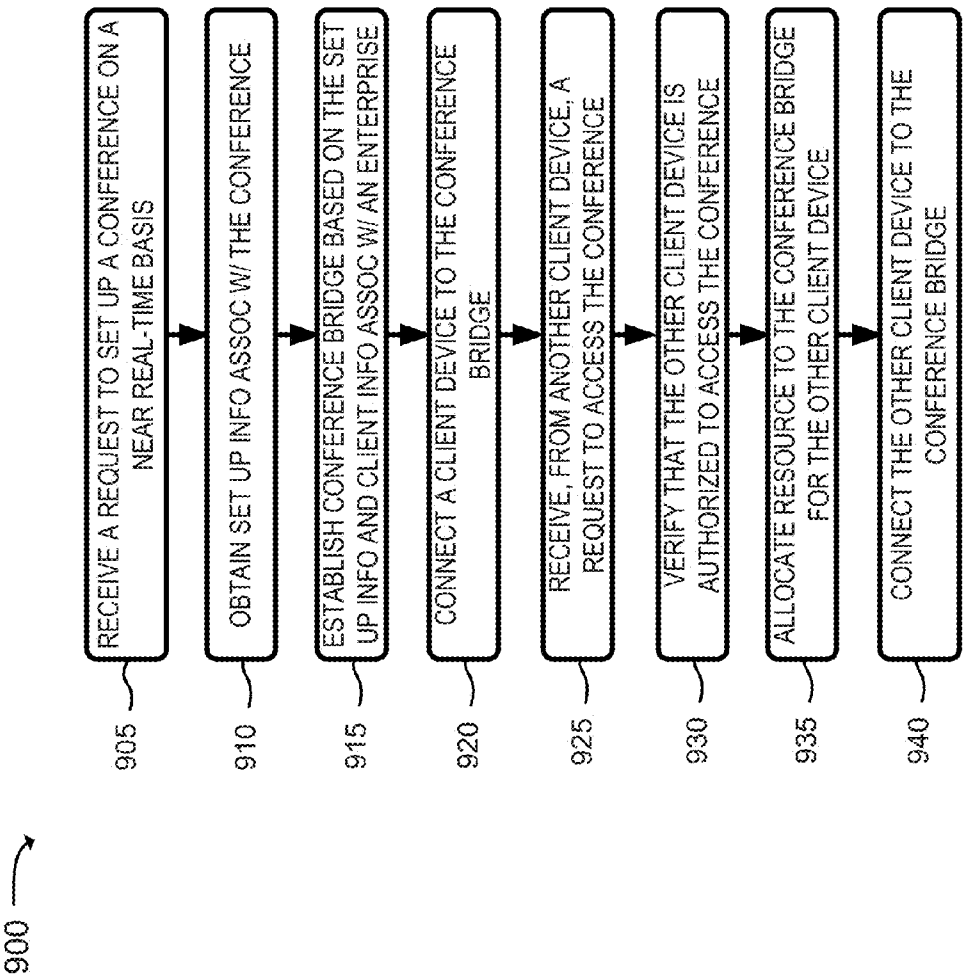

900
905
RECEIVE A REQUEST TO SET UP A CONFERENCE ON A NEAR REAL-TIME BASIS
910
OBTAIN SET UP INFO ASSOC W/ THE CONFERENCE
915
ESTABLISH CONFERENCE BRIDGE BASED ON THE SET UP INFO AND CLIENT INFO ASSOC W/ AN ENTERPRISE
920
CONNECT A CLIENT DEVICE TO THE CONFERENCE BRIDGE
925
RECEIVE, FROM ANOTHER CLIENT DEVICE, A REQUEST TO ACCESS THE CONFERENCE
930
VERIFY THAT THE OTHER CLIENT DEVICE IS AUTHORIZED TO ACCESS THE CONFERENCE
935
ALLOCATE RESOURCE TO THE CONFERENCE BRIDGE FOR THE OTHER CLIENT DEVICE
940
CONNECT THE OTHER CLIENT DEVICE TO THE CONFERENCE BRIDGE

FIG. 9

VIDEO CONFERENCE SERVICE

RELATED APPLICATION

This application is a continuation of U.S. patent application Ser. No. 13/334,446, filed Dec. 22, 2011 (now U.S. Pat. No. 8,860,777), the disclosure of which is incorporated by reference herein in its entirety.

BACKGROUND

Users, of user devices, have a growing array of networks and/or service providers from which to obtain video conferencing services. The user devices may be associated with an enterprise, such as a business, an organization, etc., that subscribes to the video conference services so that the user devices can access and utilize the video conference services. The user devices usually access the video conferencing service by calling a telephone number, utilizing a string, and/or accessing a website, and providing login credentials. When the login credentials are verified, the user devices are connected to a communication bridge via which the video conference services can be accessed by the user devices. The video conferencing services may allow users, of the user devices, to interact, on a real-time basis, with other users in a virtual multi-media environment associated with streaming voice, video, messaging, etc.

Unfortunately, the video conferencing services may allow users, that have acquired the login credentials and which are not authorized to attend the video conference, to access the video conference service. Allowing unauthorized users to access the video conference may permit confidential information associated with the enterprise to be disclosed to the unauthorized users.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram of an example environment in which systems and/or methods described herein may be implemented;

FIG. **2** is a diagram of example components of the video communication system depicted in FIG. **1**;

FIG. **3** is a diagram of example components of one or more of the devices depicted in FIGS. **1** and/or **2**;

FIG. **4** is a diagram of an example data structure that stores client information associated with an enterprise;

FIG. **5** is a flow chart of an example process for obtaining or updating client information associated with an enterprise, according to an implementation described herein;

FIG. **6** is a flow chart of an example process for setting up a multi-party conference, according to an implementation described herein;

FIG. **7** is a flow chart of an example process for determining whether a user, of a client device, is authorized to access a conference;

FIG. **8** is a diagram of example concurrent multi-tenant conferences within an example portion of the environment of FIG. **1**; and

FIG. **9** is a flow chart of an example process for setting up a conference on a just-in-time basis.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The following detailed description refers to the accompanying drawings. The same reference numbers in different drawings may identify the same or similar elements.

A system and/or method, described herein, may allow a video communication and/or conference system (VCCS), originally designed to enable a client device associated with an enterprise to hold video conferences, to set up and/or establish multiple distinct virtual environments that can be accessed by client devices associated with multiple different enterprises. Each distinct virtual environment may allow users, of respective client devices, to interact in a secure manner and/or from potentially geographically distributed locations. The VCCS may establish each of the virtual environments using public access points and/or connections (e.g., using a non-secure, generic, and/or publically accessible protocol, etc.), secure access points and/or connections (e.g., using a secure protocol, such as a tunneling protocol, a virtual private network (VPN), etc.), based on respective client information that specifies access control, call routing, communication and/or security protocols, etc. for each of the virtual environments. The VCCS may segregate virtual environments so that information, from within one virtual environment, cannot be access via another virtual environment. Establishing multiple virtual environments may enable the VCCS to provision a video conferencing service to multiple different enterprises, which may allow users, of the client devices, to communicate via a video conference while avoiding the expense associated with traveling to meetings.

A system and/or method may allow the VCCS to dynamically determine whether to permit a client device to access a virtual environment based on client information. The VCCS may, based on the client information, block a user from setting up a virtual environment that provides access to a user that is not authorized, by the client information, to access the virtual environment. A system and/or method may allow the VCCS to dynamically set up a virtual environment, on a near real-time basis, if the client information permits the user to set up the virtual environment.

FIG. **1** is a diagram of an example environment **100** in which systems and/or methods described herein may be implemented. As shown in FIG. **1**, environment **100** may include a group of client devices **110**-**1**, . . . , **110**-M (where M≥1), a group of client communication servers **120**-**1**, . . . , **120**-N (where N≥1) (hereinafter referred to collectively as "client servers **120**" and individually as "client server **120**"), a video communication and/or conference system (VCCS) **130**, and a network **140**. The number of systems, equipment, or servers, illustrated in FIG. **1**, is provided for explanatory purposes only. In practice, there may be additional systems, equipment, or servers; fewer systems, equipment, or servers; different systems, equipment, or servers; and/or differently arranged systems, equipment, or servers than illustrated in FIG. **1**.

Also, in some implementations, one or more of the devices and/or servers of environment **100** may perform one or more functions described as being performed by another one or more of the devices and/or servers of environment **100**. Devices of environment **100** may interconnect via wired connections, wireless connections, or a combination of wired and wireless connections.

Client device **110** may include one or more devices that is capable of communicating with network **140**. For example, client device **110** may include a desktop computer, a radiotelephone, a personal communications system (PCS) terminal (e.g., that may combine a cellular radiotelephone with data processing and data communications capabilities), a personal digital assistant (PDA) (e.g., that can include a radiotelephone, a pager, Internet/intranet access, etc.), a laptop

computer, a tablet computer, a camera, a personal gaming system, a smart phone, or another type of computation and/or communication device.

Client device **110** may, for example, use a camera to take a picture and/or record video that client device **110** can transmit, as an image and/or video content, respectively, to VCCS **130** via network **140** and/or client server **120**. Client device **110** may also, or alternatively, include a microphone that is capable of recording sound, such as words spoken by a user of client device **110**, that client device **110** can transmit, as audio content, to VCCS **130** via network **140** and/or client server **120**. Client device **110** may transmit, to VCCS **130**, a media stream of traffic that includes the image, the video content, the audio content, and/or other content (e.g., message content, data, etc.).

Client device **110-1** may be associated with an enterprise (e.g., shown as a dotted rectangle labeled as "Enterprise A") and may communicate with other client devices (not shown in FIG. **1**), associated with the enterprise, via client communication server **120-1** associated with the enterprise. The enterprise may be associated with a first private network (e.g., a local area network (LAN), a wide area network (WAN), etc.) located, for example, within an office where the enterprise conducts business. Client device **110-1** and/or client communication server **120-1** may be connected to the first private network. Assume that client device **110-3** is also associated with the enterprise and is not directly connected to the first private network.

Client device **110-2** may be associated with another enterprise (e.g., shown as a dotted rectangle labeled as "Enterprise B") and may communicate with other client devices (not shown in FIG. **1**), associated with the other enterprise, via client communication server **120**-N associated with the other enterprise. The other enterprise may be associated with a second private network located, for example, within an office where the other enterprise conducts business. Client device **110-2** and/or client communication server **120**-N may be connected to the second private network. Assume that client device **110**-M is also associated with the other enterprise and is not directly connected to the second private network.

Client server **120** may include one or more server devices, or other types of computation and/or communication devices, that gather, process, search, store, and/or provide information in a manner described herein. In one example, client server **120** may receive, process, and/or transmit traffic, such as voice, video, text, and/or other data associated with a virtual environment set up by a user of client device **110**. Client server **120** may maintain an authorized client list (e.g., a white list) of client devices **110** and/or users of client devices **110** that are permitted, by an operator of client server **120**, to access and/or utilize a video conference service that is provisioned by VCCS **130**. Client server **120** may also, or alternatively, maintain an unauthorized client list (e.g., black list) of other client devices **110** and/or users of the other client devices **110** that are not permitted, by the operator, to access the video conference service. Client server **120** may transmit the authorized client list and/or the unauthorized client list to VCCS **130**. Client server **120** may transmit, to VCCS **130**, an updated authorized and/or unauthorized client list when changes are made to the authorized and/or unauthorized client list, respectively.

VCCS **130** may include one or more devices that gather, process, search, store, and/or provide information in a manner similar to that described herein. VCCS **130** may be capable of communicating with client devices **110** and/or client servers **120** via network **140**. VCCS **130** may perform operations associated with setting up, establishing, or terminating one or more virtual environments via which a video conference service is provisioned to client devices **110**.

Network **140** may include one or more wired and/or wireless networks. For example, network **140** may include a cellular network, the Public Land Mobile Network (PLMN), a public switched telephone network (PSTN), and/or a second generation (2G) network, a third generation (3G) network, a fourth generation (4G) network, a fifth generation (5G) network, and/or another network (e.g., a long term evolution (LTE) network). Additionally, or alternatively, network **160** may include a wide area network (WAN), a metropolitan area network (MAN), an ad hoc network, an intranet, the Internet, and/or a combination of these or other types of networks.

FIG. **2** is a diagram of example components of VCCS **130**. VCCS **130** may include a video communication server **210**, a video controller **220**, and/or a conference module **230**. In another implementation, VCCS **130** may include additional components, fewer components, different components, or differently arranged components than are shown in FIG. **2**.

Video communication server **210** may include one or more server devices, or other types of computation and/or communication devices, that gather, process, search, store, and/or provide information in a manner described herein. Video communication server **210** may be capable of communicating, via network **140**, with client server **120** and/or client device **110**. Video communication server **210** may also, or alternatively, be capable of communicating with video controller **220** and/or conference module **230**.

In one example, video communication server **210** may receive, process, and/or transmit traffic, such as voice, video, text, and/or other data associated with a virtual environment via which a conference (e.g., a video conference, a telephone conference, etc.) is to be set up and/or conducted. Video communication server **210** may also, or alternatively, communicate using a variety of transport and/or signaling protocols (e.g., a streaming protocol, an IP, a telepresence interworking protocol (TIP), etc.) that allow video communication server **210** to communicate with a variety of types of client servers **120** (e.g., Cisco Unified Call Manager (CUCM), etc.) and/or client devices **110** (e.g., Cisco Telepresence System (CTS), etc).

Video communication server **210** may, for example, communicate with client server **120** to obtain client information associated with one or more enterprises (e.g., enterprise A, enterprise B, etc.). The client information, for a particular enterprise, may generally identify which client devices **110** are authorized to access and/or utilize a video conferencing service being provisioned by VCCS **130** and/or which client devices **110** are not authorized to access and/or utilize the video conference service. Video communication server **210** may provide the client information to video controller **220**.

Video communication server **210** may also, or alternatively, receive a request, from client device **110**, to set up a virtual environment via which to hold a conference. Video communication server **210** may forward the request for processing to video controller **220**. Based on an indication, received from video controller **220**, that client device **110** is authorized to set up the virtual environment, video communication server **210** may instruct conference module **230** to establish a bridge to which one or more client devices **110** can connect to attend the conference. Additionally, or alternatively, video communication server **210** may receive a request, from another client device **110**, to access the conference and may forward a request to video controller **220** to determine whether the other client device **110** is authorized to access the bridge associated with the conference. Video communication server **210** may receive, from video controller

220, an indication that client device 110 is authorized to access the conference and may forward the request to conference module 230 to establish a connection between client 110 and the bridge. Video communication server 210 may not forward the request to conference module 230 based on an indication that the other client device 110 is not authorized to access the conference.

Video controller 220 may include one or more server devices, or other types of computation and/or communication devices, that gather, process, search, store, and/or provide information in a manner described herein. In one example, video controller 220 may be capable of communication with video communication server 210 and/or conference module 230. Video controller 220 may receive, from video communication server 210, client information associated with one or more enterprises (e.g., enterprise A, enterprise B, etc.). Video controller 220 may store the client information in a memory associated with VCCS 130.

Video controller 220 may also, or alternatively, receive, from video communication server 210, set up information associated with a request to set up a conference. The set up information may generally identify which client device 110 is to participate in the conference, a time at which the conference is to occur, etc. Video controller 220 may determine whether a user, of client device 110 from which the request originated, is authorized to set up the conference based on client information associated with an enterprise with which the user is associated. Video controller 220 may transmit, to video communication server 210, an indication of whether client device 110 is authorized to set up the conference.

Video controller 220 may also, or alternatively, determine whether users, of other client devices 110, are authorized to access the conference by determining whether the other client devices 110 are authorized by the set up information and/or is not precluded from accessing the conference by the client information. Video controller 220 may transmit, to video communication server 210, an indication of whether the other client devices 110 are authorized to attend the conference.

Conference module 230 may include one or more devices that are capable of creating a bridge associated with a conference (e.g., a video conference, a telephone conference, etc.), between client devices 110. The bridge may permit multiple client devices 110 to be connected to create a virtual environment in which to conduct a conference where each client device 110 can communicate with other client devices 110 connected to the bridge. Conference module 230 may create the bridge based on set up information received from video communication server 210 and/or video controller 220. Conference module 230 may, allocate resources to allow the bridge to be set up, such as a quantity of ports, associated with the bridge, based on a quantity of client devices 110 identified by the set up information. Conference module 230 may also, or alternatively, schedule a period of time, identified by the set up information, during which resources (e.g., bandwidth, processing and/or switching capacity, etc.) are to be allocated for the bridge. Conference module 230 may receive, from video communication server 210, a request to access the bridge, associated with client device 110, and may connect client device 110 to the bridge. Conference module 230 may provide services associated with the bridge, such as audio and/or video recordings, text transcriptions, etc. Conference module 230 may terminate the conference at a time identified by the set up information, which may cause client device 110 to be disconnected from the bridge.

FIG. 3 is a diagram of example components of a device 300 that may correspond to client device 110, client server 120, video communication server 210, video controller 220, and/or conference module 230. Alternatively, each of client device 110, client server 120, video communication server 210, video controller 220, and/or conference module 230 may include one or more devices 300 and/or one or more components of device 300. Device 300 may include a bus 310, a processor 320, a memory 330, an input component 340, an output component 350, and a communication interface 360. In another implementation, device 300 may include additional components, fewer components, different components, or differently arranged components than are shown in FIG. 3.

Bus 310 may include a path that permits communication among one or more of the components of device 300. Processor 320 may include a processor, microprocessor, or processing logic that may interpret and execute instructions. Memory 330 may include any type of dynamic storage device that may store information and instructions for execution by processor 320, and/or any type of non-volatile storage device that may store information for use by processor 320.

Input component 340 may include a mechanism that permits a user to input information to device 300, such as a keyboard, a keypad, a pointing device, a button, a switch, etc. Output component 350 may include a mechanism that outputs information to the user, such as a display, a speaker, one or more light emitting diodes (LEDs), etc. Communication interface 360 may include any transceiver-like mechanism that enables device 300 to communicate with other devices and/or systems. For example, communication interface 360 may include an Ethernet interface, an optical interface, a coaxial interface, or the like.

As will be described in detail below, device 300 may perform certain operations relating to provisioning a video conference service. Device 300 may perform these operations in response to processor 320 executing software instructions contained in a computer-readable medium, such as memory 330. A computer-readable medium may be defined as a non-transitory memory device. A memory device may include space within a single physical memory device or spread across multiple physical memory devices. The software instructions may be read into memory 330 from another computer-readable medium or from another device. The software instructions contained in memory 330 may cause processor 320 to perform processes described herein. Alternatively, hardwired circuitry may be used in place of or in combination with software instructions to implement processes described herein. Thus, implementations described herein are not limited to any specific combination of hardware circuitry and software.

FIG. 4 is a diagram of an example data structure 400 that stores client information associated with an enterprise. Data structure 400 may be stored in a memory associated with client server 120 and/or VCCS 130. Data structure 400 may include a collection of fields, such as, for example, an enterprise field 410, a client server identifier (ID) field 415, a client device ID field 420, a user information (info) field 425, a privilege level field 430, a type field 435, and an access field 440. The quantity of fields, within data structure 400, is provided for explanatory purposes. In another implementation, there may be additional fields, fewer fields, different fields, or differently arranged fields than are shown in FIG. 4.

Enterprise field 410 may store information that identifies an enterprise (e.g., a company name, identifier, etc.) with which a particular client device 110 is associated. Client server ID field 415 may store information associated with client server 120 (e.g., an IP address, a uniform resource locator (URL), a uniform resource identifier (URI), a media access control (MAC) address, etc.) via which the particular client device 110, associated with the enterprise, communi-

cates with video communication server **210**. Client device ID field **420** may store information associated with the particular client device **110**, such a device identifier (e.g., a mobile directory number, a landline directory number, etc.), an address (e.g., an IP address, a URL, a URI, a MAC address, etc.), information associated with a type of client device **110** (e.g., a computer, a mobile device, a CTS, etc.), etc. Client device ID field **420** may also, or alternatively, store information associated with a type of encryption that the particular client device **110** is capable of using.

User info field **425** may store information associated with a user of the particular client device **110** (e.g., a name, a home address, a business address, a username, password, personal identification number (PIN), etc.).

Privilege level field **430** may store information that identifies a privilege level associated with the user of the particular client device **110**. The privilege level may, for example, identify whether the user is authorized to access a video conference service, being provisioned by VCCS **130**, to set up a conference and/or to invite users of other client devices **110**, associated with the enterprise, to the conference. Additionally, or alternatively, the privilege level may identify whether the user is authorized to invite users, of other client devices **110**, to attend a conference (e.g., a conference set up by the user) that are not associated with the enterprise and/or are associated with a different enterprise.

Type field **435** may store information that identifies whether the user is an internal user associated with the enterprise, an external user associated with the enterprise, or a user that is not associated with the enterprise or is associated with a different enterprise (e.g., a partner of the enterprise, a competitor of the enterprise, etc.). For example, an internal user may be associated with client device **110** that is directly connected to a private network associated with an enterprise and/or with communication server **120** associated with the enterprise. An external user may be associated with client device **110** that communicates indirectly with the private network and/or communication server **120** (e.g., via network **140** and/or another communication server **120** associated with a different enterprise).

Access field **440** may store information that identifies whether the user and/or the particular client device **110** is authorized to attend a conference that is set up by another user of a different client device **110**.

For example, an operator, of client server **120**, may enter client information, associated an enterprise, into data structure **400** (e.g., via a user interface, retrieved from a memory, obtained from another server device, etc.) that identifies users, of client devices **110**, that are authorized to access a video conference service provisioned by VCCS **130**. In one example, data structure **400** may store client information that identifies the enterprise (e.g., A), client server **120** associated with the enterprise (e.g., **120-1**), and/or information associated with first client device **110** associated with the enterprise (e.g., CE1) (e.g., as shown by ellipse **442**). Data structure **400** may also, or alternatively, store information associated with a first user (e.g., user1) of the first client device **110**, a privilege level of the first user (e.g., high), and an indication (e.g., internal) that the first client device **110** is connected to a private network (e.g., a LAN, WAN, etc.) associated with the enterprise (e.g., as shown by ellipse **442**). Data structure **400** may also, or alternatively, store information that identifies whether first client device **110** is permitted to attend a video conference (e.g., yes) (e.g., as shown by ellipse **442**). A high privilege level may indicate that the first user is authorized to invite a user associated with external client device **110** that is not connected to the private network and/or that is associated with another enterprise.

Additionally, or alternatively, data structure **400** may store client information associated with second client device **110** (e.g., CE2) that is associated with the enterprise (e.g., A), but is outside of and/or not connected to (e.g., external) the private network associated with the enterprise (e.g., as shown by ellipse **444**). Second client device **110** may also be authorized to access the video conference service (e.g., yes) (e.g., as shown by ellipse **444**). Data structure **400** may also, or alternatively, store information that identifies a privilege level (e.g., standard) that permits the second user to set up a conference that internal and/or external client device **110**, associated with the enterprise, are permitted to attend, but not external client device **110** that are not associated with the enterprise (e.g., as shown by ellipse **444**).

Data structure **400** may also, or alternatively, store client information associated with a third user (e.g., user3), of third client device **110** (e.g., CE3) associated with another enterprise (e.g., partner B), that is authorized to access the video conference service (e.g., yes) (e.g., as shown by ellipse **446**). The third user may, for example, correspond to an employee, associated with the other enterprise, that is authorized to work on a project with employees of the enterprise. Third client device **110** may be authorized to access the video conference service, via another client server **120** (e.g., **120**-M) associated with the other enterprise, that is external to the private network (e.g., external) (e.g., as shown by ellipse **446**).

Data structure **400** may also store client information associated with users (e.g., user4, user5, etc.) and/or client device **110** (e.g., CE4, CE5, etc.) that are not authorized to access the video conference service (e.g., no) and/or have a privilege level that indicates that the users are not authorized to set up a conference (e.g., none) (e.g., as shown by ellipses **448** and **450**). The users may be associated with the enterprise (e.g., A) and/or the other enterprise (e.g., partner B) (e.g., as shown by ellipses **448** and **450**).

FIG. **5** is a flow chart of an example process **500** for obtaining or updating client information associated with an enterprise, according to an implementation described herein. In one implementation, process **500** may be performed by VCCS **130**. In another implementation, some or all of process **500** may be performed by a device or collection of devices separate from, or in combination with, VCCS **130**.

As shown in FIG. **5**, process **500** may include receiving an instruction to obtain client information associated with an enterprise (block **505**) and obtaining, from a client server associated with an enterprise, the client information (block **510**). For example, VCCS **130** may receive an instruction, from an operator of VCCS **130** and/or based on an occurrence of some event (e.g., based on a predetermined time interval, a time of day, etc.), to obtain client information associated with one or more enterprises that have subscribed to a video conference service provisioned by VCCS **130**. VCCS **130** may, as a result of the instruction, transmit, to client server **120** associated with an enterprise, a request for client information associated with the enterprise. Client server **120** may receive the request and may provide the client information to VCCS **130**.

In another example, client server **120** may provide, to VCCS **130**, the client information without receiving the request from VCCS **130**. Client server **120** may, for example, automatically, or in response to an instruction from an operator of client server **120**, provide the client information to VCCS **130**. In one example, the operator, of client server **120**, may enter client information, associated with the enterprise,

into a data structure (e.g., data structure **400** of FIG. **4**) for the first time and may instruct client server **120** to transmit the client information to VCCS **130**. Additionally, or alternatively, client server **120** may access a website hosted by VCCS **130** and/or a database to which VCCS **130** has access. VCCS **130** may obtain the client information via the website (e.g., via web page associated with the website) and/or by accessing the database and retrieving the client information from the database.

The client information may include a respective first entry for each client device **110** that is authorized to use and/or access a video conference service that is provisioned by VCCS **130** and/or a respective second entry for each client device **110** that is not authorized to use and/or access the video conference service. In another example, the operator, of client server **120**, may update the client information (e.g., by adding or removing entries from the client information) and may cause client server **120** to transmit, to VCCS **130**, the updated client information. VCCS **130** may receive the client information from client server **120**.

Process **500** may include comparing the client information to other client information that is stored in the memory (block **515**) and storing, in the memory, client information that does not match other client information that is stored within the memory (block **520**). For example, VCCS **130** may compare the client information, received from client server **120**, to other client information stored within a memory associated with VCCS **130**. Based on a determination, that the received client information does not match the other client information, VCCS **130** may store the client information in the memory associated with VCCS **130**. In another example, VCCS **130** may determine that one or more entries, associated with one or more client devices **110** and within the received client information, does not match any entries of the other client information. Based on the determination that the one or more entries do not match any of the entries of the other client information, VCCS **130** may associate, within the memory, the one or more entries with the other client information.

Process **500** may include removing, from the memory, other client information that is not included within the client information (block **525**) and may transmit, to the client server, a notification that identifies client information stored and/or other client information removed from the memory (block **530**). For example, VCCS **130** may determine that one or more entries, within the other client information associated with the enterprise and stored within the memory, does not match any entries of the received client information. Based on the determination that the one or more entries, within the other client information, does not match any of the entries of the received client information, VCCS **130** may erase, overwrite and/or otherwise remove, from the memory, the one or more entries that do not match any of the entries associated with the received client information.

VCCS **130** may transmit a notification, to client server **120**, that indicates that the client information has been stored within the memory. The notification may identify the one or more entries that were associated, within the memory, with the other client information. Additionally, or alternatively, the notification may identify the one or more entries, associated with the other client information, that were removed from the memory.

FIG. **6** is a flow chart of an example process **600** for setting up a multi-party conference, according to an implementation described herein. In one implementation, process **600** may be performed by VCCS **130**. In another implementation, some or all of process **600** may be performed by a device or collection of devices separate from, or in combination with, VCCS **130**.

As shown in FIG. **6**, process **600** may include receiving, from a client device associated with an enterprise, a request to set up a conference (block **605**) and obtaining, from the client device, set up information associated with the conference (block **610**). For example, a user of client device **110** may access VCCS **130** to set up a video conference to be attended by one or more other client devices **110**. In one example, client device **110** may access a website hosted by VCCS **130** and the user may enter, via a web page associated with the website, set up information associated with the conference. VCCS **130** may receive the set up information via the web page. In another example, client device **110** may communicate with client server **120** and the user may provide the set up information to client server **120** (e.g., via a user interface, etc.). Client server **120** may transmit the set up information to VCCS **130** and VCCS **130** may receive, from client server **120**, the set up information.

The set up information may include information that identifies the user (e.g., a username, password, personal identification number, etc.), client device **110** (e.g., device identifier, MDN, IP address, MAC address, etc.), an enterprise with which client device **110** is associated (e.g., an enterprise name, identifier, etc.), client server **120** (e.g., a device identifier, IP address, MAC address, etc.), one or more other client devices **110** that are to attend the conference, one or more enterprises with which the other client devices **110** are associated, and/or one or more users of the other client devices **110**. The set up information may also, or alternatively, identify a time period (e.g., a start time, an end time, an expected duration, etc.) during which the conference is to be held; features to be enabled during the conference, such as streaming video, streaming audio, generation of a video and/or audio recording of the conference, generation of a text transcript of the conference, applications to be used during the conference (e.g., a word processing application, a presentation application, etc.); and/or other set up information.

Process **600** may also include retrieving client information associated with the enterprise (block **615**) and identifying, based on the set up information, client devices that are to access the conference (block **620**). For example, VCCS **130** may retrieve, from a memory associated with VCCS **130** (e.g., from data structure **400** of FIG. **4**), client information associated with the enterprise identified by the set up information. In another example implementation, VCCS **130** may communicate with client server **120**, identified by the set up information, to obtain the client information. Additionally, or alternatively, VCCS **130** may, based on the set up information, identify each client device **110** that is permitted to access the conference.

If an identified client device is not authorized to attend the conference (block **625**—NO), then process **600** may include transmitting a notification that the identified client device is not authorized to attend the conference (block **630**). For example, VCCS **130** may determine whether client device **110**, from which the set up information was received, is authorized to set up the conference by identifying whether a privilege level, specified by the client information and associated with the user of client device **110**, is less than a threshold. Based on a determination that the privilege level is less than the threshold, VCCS **130** may transmit a notification, to client device **110**, that the user is not authorized to set up the conference. If, however, VCCS **130** determines that the privilege level, associated with the user, is not less than the threshold, VCCS **130** may determine whether other client devices

110, identified by the set up information, are authorized to attend the conference based on the client information.

VCCS 130 may, for example, determine whether the client information, associated with client devices 110 identified by the set up information, authorizes the identified client device 110 to attend the conference. Based on a determination that the client information does not include an indication that the identified client device 110 is authorized to attend the conference, VCCS 130 may transmit a notification, to client device 110, indicating that the identified client device 110 is not authorized to attend the conference. In this example, VCCS 130 may determine that the identified client device 110 is not identified in a list of client devices 110 (e.g., a white list) that are authorized to attend a conference.

Additionally, or alternatively, the client information may indicate that identified client device 110 is not capable of communicating using an encryption scheme identified by the client information. Based on the indication that the identified client device 110 is not capable of communicating using the encryption scheme, VCCS 130 may not permit the identified client device 110 to attend the conference and/or may transmit a notification, to client device 110, indicating that the identified client device 110 is not authorized to attend the conference.

Additionally, or alternatively, based on a determination that the identified client device 110 is not authorized to attend the conference, VCCS 130 may transmit a notification, to client device 110, indicating that the identified client device 110 is not authorized to attend the conference. In this example, VCCS 130 may determine that the identified client device 110 is not authorized to attend the conference when the identified client device 110 is identified in a list (e.g., a black list) of client devices 110 that is not authorized to attend a conference and/or is associated with another enterprise that is not authorized to attend the conference.

Additionally, or alternatively, VCCS 130 may transmit the notification that the identified client device 110 is not authorized to attend the conference when VCCS 130 determines that a privilege level, associated with the user of client device 110, does not permit client device 110 to set up a conference with identified client device 110 associated with another enterprise and/or that is external to and/or not connected to a LAN/WAN associated with the enterprise.

If an identified client device is authorized to attend the conference (block 625-YES), then process 600 may include generating conference information to set up the conference based on the set up information (block 635). For example, VCCS 130 may determine that client device 110, from which the set up information was received, is authorized to set up the conference based on a determination that the privilege level, specified by the client information, is not less than the threshold and/or matches a particular level.

Additionally, or alternatively, VCCS 130 may determine that the identified client device 110 is authorized to attend the conference based on a determination that the identified client device 110 is identified in the list of client devices 110 (e.g., the white list) that are authorized to attend the conference.

Additionally, or alternatively, VCCS 130 may determine that the identified client device 110 is authorized to attend the conference based on a determination that the privilege level, associated with the user of client device 110, permits client device 110 to set up a conference with identified client devices 110 associated with another enterprise and/or that is external to and/or not connected to a LAN/WAN associated with the enterprise.

Additionally, or alternatively, VCCS 130 may determine that the identified client device 110 uses the encryption scheme identified by the client information and may permit the identified client device 110 to attend the conference based on the determination that identified client device 110 uses the encryption scheme.

Based on the determination that the user is authorized to set up the conference and/or that the identified client device 110 is authorized to attend the conference, VCCS 130 may generate conference information to be used to establish the conference. VCCS 130 may, for example, schedule the conference based on the time period identified by the set up information. Additionally, or alternatively, VCCS 130 may allocate resources for the scheduled conference based on a quantity of client devices 110 that are to attend the conference, such as bandwidth resources (e.g., for some or all client devices 110), ports via which client devices 110 are to access the conference, an address associated with the conference (e.g., an IP address, a URL, etc.), a telephone number associated with the conference, and/or access information with which to access the conference (e.g., login information, such as a username, password, PIN, etc.), etc.

VCCS 130 may also, or alternatively, obtain, from the client information, information associated with identified client device 110, such as a respective device identifier (e.g., an MDN, a LDN, etc.), a respective address (e.g., an IP address, a MAC address, etc.), information associated with a respective user of identified client device 110 (e.g., a username, password, PIN, etc.), information associated with an encryption scheme used by the identified client device 110, etc. VCCS 130 may also, or alternatively, obtain, from the client information, information associated with a particular client server 120 via which identified client device 110 is to access the conference (e.g., a device identifier, an address, etc.).

Process 600 may further include transmitting a notification to identified client devices that are authorized to attend the conference (block 640) and establishing a conference bridge based on the conference information (block 645). For example, VCCS 130 may transmit a notification to identified client devices 110 that are authorized to attend the conference. In one example, the notification may correspond to an invitation to attend the conference that identifies a time at which the conference is to start, a telephone number to be called to access the conference, a destination address (e.g., an IP address, a URL, etc.) to be used to communicate with VCCS 130 to attend the conference, etc. Additionally, or alternatively, the invitations may include login information (e.g., a username, a password, a PIN, etc.) to be used by the users of the identified client devices 110 to access the conference.

VCCS 130 may establish a conference bridge, associated with the conference, for the time period identified by the conference information. VCCS 130 may, for example, establish the conference bridge by allocating the bandwidth and/or assigning the ports, to the conference bridge, that were specified by the conference information. VCCS 130 may also, or alternatively, associate the telephone number, the destination address, and/or the login information to the conference bridge that allows the identified client devices 110 to access the conference bridge during the time period. VCCS 130 may allow each identified client device 110 to communicate with the conference bridge based on the telephone number and/or the destination address. VCCS 130 may also, or alternatively, establish a connection, via a respective port, between each identified client device 110 and the conference bridge, when the login information is received from each of the identified client devices 110 and/or is verified by VCCS 130. Establishing the connection to the conference bridge may permit each identified client device 110 to communicate with all or a

portion of other identified client devices **110** that have established the connection to the conference bridge.

FIG. **7** is a flow chart of an example process **700** for establishing a connection between a client device and a conference bridge. In one implementation, process **700** may be performed by VCCS **130**. In another implementation, some or all of process **700** may be performed by a device or collection of devices separate from, or in combination with, VCCS **130**.

As shown in FIG. **7**, process **700** may include receiving a request to access a conference (block **705**) and retrieving conference information associated with the conference (block **710**). For example, a user, of client device **110**, may cause client device **110** to transmit a request, to VCCS **130**, to access a conference that was set up by VCCS **130** in a manner similar to that described above with respect to process **600** of FIG. **6**. VCCS **130** may receive the request and may analyze one or more packets (e.g., packet headers, trailers, labels, payloads, etc.), associated with the request, to identify a conference bridge, associated with the conference, to be accessed by client device **110**. In one example, VCCS **130** may obtain, from the packets, a destination address (e.g., a URL, an IP address, etc.), a telephone number, an identifier, etc. that corresponds to the conference bridge. VCCS **130** may, in response to the request, retrieve, from a memory associated with VCCS **130**, conference information that corresponds to the conference identified by the request.

Process **700** may also include identifying the client device from which the request was received (block **715**). For example, VCCS **130** may analyze one or more packets, associated with the request, to identify client device **110** from which the request was received. VCCS **130** may, for example, identify within the packets (e.g., within the packet header, trailer, label, payload, etc.), a source address (e.g., an IP address, a MAC address, a URI, etc.), information associated with a user (e.g., username, password, PIN, etc.), a device identifier (e.g., a MDN, a LDN, etc.), etc. associated with client device **110**. Additionally, or alternatively, VCCS **130** may identify, from the packets, an address associated with client server **120** (e.g., an IP address, a URI, a MAC address, etc.) via which the request, from client device **110**, was received. VCCS **130** may identify client device **110** based on the information, associated with client device **110**, obtained from the packets.

If the client device is not authorized to access the conference (block **720**—NO), then process **700** may include transmitting a notification that the client device is not authorized to access the conference (block **725**). For example, VCCS **130** may determine whether client device **110** is authorized to access the conference based on the conference information and information obtained from the packets. In one example, VCCS **130** may determine that information associated with client device **110** (e.g., the source address) does not match any of the information associated with client device **110** included within the conference information. Based on a determination that the information, associated with the client device **110**, does not match any information associated with client device **110** included within the conference information, VCCS **130** may transmit a notification, to client device **110**, indicating that client device **110** is not authorized to attend the conference.

Additionally, or alternatively, VCCS **130** may determine that information that identifies the conference (e.g., a destination address, etc.), obtained from the packets, does not correspond to a conference bridge that client device **110** is authorized to attend. Based on the determination that the information that identifies the conference does not correspond to a conference bridge that client device **110** is authorized to attend, VCCS **130** may transmit a notification, to client device **110**, indicating that client device **110** is not authorized to attend the conference.

Additionally, or alternatively, VCCS **130** may determine that login information (e.g., a username, password, PIN, etc.), associated with the request to access the conference, does not match login information, associated with the conference and identified within the conference information. Based on the determination that the login information does not match login information, associated with the conference and identified within the conference information, VCCS **130** may transmit a notification, to client device **110**, indicating that client device **110** is not authorized to attend the conference.

If the client device is authorized to access the conference (block **720**—YES), then process **700** may include establishing a connection between the client device and the conference bridge associated with the conference (block **730**). For example, VCCS **130** may determine that information, associated with client device **110** (e.g., the source address), matches information, associated with client device **110**, included within the conference information. Based on a determination that the information, associated with the client device **110**, matches the information, associated with client device **110** included within the conference information, VCCS **130** may connect client device **110**, via a port identified by the conference information, to a conference bridge associated with the destination address.

Additionally, or alternatively, VCCS **130** may determine that information that identifies the conference (e.g., based on the destination address, etc.) corresponds to the conference bridge that client device **110** is authorized to attend. Based on the determination that the information that identifies the conference corresponds to the conference bridge that client device **110** is authorized to attend, VCCS **130** may connect client device **110** to the conference bridge.

Additionally, or alternatively, VCCS **130** may determine that the login information matches login information, associated with the conference and identified within the conference information. Based on the determination that the login information matches the login information, associated with the conference and identified within the conference information, VCCS **130** may connect client device **110** to the conference bridge.

FIG. **8** is a diagram of an example of concurrent conferences within an example portion **800** environment **100**. As illustrated in FIG. **8**, example environment portion **800** may include a group of client devices **110-1**, **110-2**, **110-3**, and **110**-M; client servers **120-1** and **120**-N; and VCCS **130**. Client devices **110-1**, **110-2**, **110-3**, and **110**-M; client servers **120-1** and **120**-N; and VCCS **130** may include the features described above in connection with FIG. **1** and/or FIG. **2**.

As shown in FIG. **8**, example portion **800** represents concurrent conferences being hosted by VCCS **130**. The concurrent conferences may include a first multi-party conference (e.g., represented by the circles labeled as "1") (hereinafter referred to as "first conference") between two or more client devices **110** (e.g., client device **110-1** and **110-3**) and a second multi-party conference (e.g., represented by the circles labeled as "2") (hereinafter referred to as "second conference") between two or more other client devices **110** (e.g., client device **110-2** and **110**-M).

Each of the concurrent conferences may be set up in a manner similar to that described above with respect to process **600** of FIG. **6**. For example, VCCS **130** may establish the first conference based on first set up information, received from first client device **110** (e.g., first client device **110-3**), and/or client information associated with a first enterprise (e.g.,

enterprise A), received from first client server **120** (e.g., first client server **120-1**). Additionally, or alternatively, VCCS **130** may establish the second conference based on second set up information, received from second client device **110** (e.g., second client device **110**-M), and/or client information associated with a second enterprise (e.g., enterprise B), received from second client server **120** (e.g., second client server **120**-N). In this example, the first conference may be established for a first period of time that occurs during all or a portion of a second period of time during which the second conference is established.

First client device **110** may be associated with the first enterprise and may, in a manner similar to that described above with respect to process **700** of FIG. **7**, access the first conference by communicating, via first client server **120**, with VCCS **130** and/or providing login credentials (e.g., as shown by the left-pointing arrows labeled as "1") that permit VCCS **130** to connect first client device **110** to a first conference bridge associated with the first conference. Third client device **110** (e.g., third client device **110-1**) may, in a manner similar to that described above with respect to process **700** of FIG. **7**, access the first conference by communicating with VCCS **130** and/or providing login credentials (e.g., as shown by the right-pointing arrow labeled as "1") that permit VCCS **130** to connect third client device **110** to the first conference bridge.

Connecting first client device **110** and/or third client device **110** to the first conference bridge may permit first client device **110** and third client device **110** to communicate via the first conference bridge in a secure manner (e.g., as shown by shaded block arrows labeled as "1"). The shaded block arrows may represent secure connections (e.g., associated with a tunneling protocol, a virtual private network, etc.) that do not allow traffic, transmitted via the first conference bridge, to be received from and/or transmitted to client device **110** that is not connected, or authorized to be connected, to the first conference bridge. Additionally, or alternatively, information used to set up and/or establish the first conference (e.g., the set up information, the client information, and/or conference information) may be stored and/or handled, by VCCS **130**, in a manner that does not allow the information used to set up and/or establish the first conference to be received from and/or transmitted to client device **110**, that is not connected, or authorized to be connected, to the first conference bridge.

Second client device **110** may be associated with the second enterprise and may, in a manner similar to that described above with respect to process **700** of FIG. **7**, access the second conference by communicating, via second client server **120**, with VCCS **130** and/or providing login credentials (e.g., as shown by the left-pointing arrows labeled as "2") that permit VCCS **130** to connect second client device **110** to a second conference bridge associated with the second conference. Fourth client device **110** (e.g., fourth client device **110-2**) may, in a manner similar to that described above with respect to process **700** of FIG. **7**, access the second conference by communicating with VCCS **130** and/or providing login credentials (e.g., as shown by the right-pointing arrow labeled as "2") that permit VCCS **130** to connect fourth client device **110** to the second conference bridge.

Connecting second client device **110** and/or fourth client device **110** to the second conference bridge may permit second client device **110** and/or fourth client device **110** to communicate via the second conference bridge in a secure manner (e.g., as shown by block arrows labeled as "2"). The block arrows may, in a manner similar to that described above, represent secure connections that do not allow traffic, transmitted via the second conference bridge, to be received from and/or transmitted to client device **110** that is not connected, or authorized to be connected, to the second conference bridge. Additionally, or alternatively, information used to set up and/or establish the second conference may be stored and/or handled, by VCCS **130**, in a manner that does not allow the information used to set up and/or establish the second conference to be received from and/or transmitted to client device **110**, that is not connected, or authorized to be connected, to the second conference bridge.

FIG. **9** is a flow chart of an example process for setting up a conference on a just-in-time basis. In one implementation, process **900** may be performed by VCCS **130**. In another implementation, some or all of process **900** may be performed by a device or collection of devices separate from, or in combination with, VCCS **130**.

As shown in FIG. **9**, process **900** may include receiving a request to set up a conference on a near real-time basis (block **905**) and obtain set up information associated with the conference (block **910**). For example, a user of client device **110** may access VCCS **130** to set up a video conference on a just-in-time basis. For example, setting up the video conference on the just-in-time basis may correspond to setting up the video conference on a near real-time basis and/or an on-the-fly basis as client devices **110** attempt to access the video conference. VCCS **130** may, for example and in response to the request, obtain set up information from client device **110**. For example, VCCS **130** may, in a manner similar to that described above with respect to block **605** of FIG. **6**, obtain set up information, associated with the just-in-time conference, from client device **110** via a web page (e.g., associated with a website hosted by VCCS **130**), a user interface (e.g., via client server **120**), etc.

The set up information may include information that identifies the user (e.g., a username, password, personal identification number, etc.), client device **110** (e.g., device identifier, MDN, IP address, MAC address, etc.), an enterprise with which client device **110** is associated (e.g., an enterprise name, identifier, etc.), client server **120** (e.g., a device identifier, IP address, MAC address, etc.), etc. The set up information may also, or alternatively, identify that the conference is to be established on a just-in-time basis; features to be enabled during the conference, such as streaming video, streaming audio, generation of a video and/or audio recording of the conference, generation of a text transcript of the conference, applications to be used during the conference (e.g., a word processing application, a presentation application, etc.); and/or other set up information.

Process **900** may also include establishing a conference bridge based on the set up information and client information associated with an enterprise (block **915**) and connecting the client device to the conference bridge (block **920**). For example, VCCS **130** may, based on the set up information, identify an enterprise with which client device **110** is associated. VCCS **130** may also, or alternatively, retrieve, from a memory associated with VCCS **130**, client information associated with the enterprise.

VCCS **130** may, in a manner similar to that described above with respect to block **625** of FIG. **6**, determine whether client device **110** is authorized to access a conference based on whether client device **110** is identified in a list of client devices **110**, within the client information, that are approved to access a conference. Based on an indication that client device **110** is not identified in the list of client devices **110** that are approved to access a conference, VCCS **130** may not permit client information **110** to set up and/or access the just-in-time conference. In another example, VCCS **130** may permit client information **110** to set up and/or access the

just-in-time conference based on an indication that client device **110** is identified in the list of client devices **110** that are approved to access a conference.

Additionally, or alternatively, VCCS **130** may, in a manner similar to that described above with respect to block **625** of FIG. **6**, determine whether a user, of client device **110**, is authorized to set up the just-in-time conference based on whether a privilege level, associated with the user and identified by the client information, is greater than a threshold. Based on a determination that the privilege level is less than the threshold and/or matches a particular level, VCCS **130** may not set up the just-in-time conference. In another example, VCCS **130** may determine that the user is authorized to set up the just-in-time conference based on a determination that the privilege level is not less than the threshold and/or matches a different particular level.

VCCS **130** may establish a conference bridge, associated with the just-in-time conference, based on the determination that the user is authorized to set up the just-in-time conference. VCCS **130** may, for example, allocate resources for the conference bridge, such as bandwidth resources for client device **110**, a port via which client device **110** is to be connected to the conference bridge, an address associated with the conference (e.g., an IP address, a URL, etc.), a telephone number associated with the conference, and/or access information with which to access the conference (e.g., login information, such as a username, password, PIN, etc.), etc. VCCS **130** may connect client device **110** to the conference bridge via the port associated with the conference bridge.

Process **900** may further include receiving, from another client device, a request to access the conference (block **925**) and verifying that the other client device is authorized to access the conference (block **930**). For example, other client device **110** may transmit, to VCCS **130**, a request to access the just-in-time conference. VCCS **130** may receive the request and may analyze one or more packets, associated with the request, to obtain information associated with the other client device **110**. The information associated with other client device **110** may, for example, include a source address (e.g., an IP address, a MAC address, a URL, etc.), a device identifier (e.g., MDN, LDN, etc.), etc. VCCS **130** may also, or alternatively, analyze the packets to identify a destination address (e.g., a URL, URI, etc.) for the conference bridge associated with the just-in-time conference. The other client device **110** may, in one example, have receive the destination address, associated with the conference bridge, from VCCS **130** and/or client device **110** as a result of establishing the conference bridge.

VCCS **130** may determine whether the other client device **110** is identified (e.g., based on the source address, the device identifier, etc.) in the list of client devices **110**, within the client information, that are authorized to attend a conference. Based on a determination that the other client device **110** is not identified within the list of client devices **110** that are authorized to access a conference, VCCS **130** may transmit a notification to other client device **110** indicating that the other client device **110** is not authorized to attend the just-in-time conference.

If, however, VCCS **130** determines that other client device **110** is identified within the list of client devices **110** that are authorized to access a conference, VCCS **130** may authorize the other client device **110** to access the conference bridge.

Process **900** may include allocating resources, to the conference bridge, for the other client device (block **935**) and connecting the other client device **110** to the conference bridge (block **940**). For example, based on the determination that the other client device **110** is authorized to access the just-in-time conference, VCCS **130** may allocate other resources to the conference bridge associated with the just-in-time conference. For example, VCCS **130** may allocate another port, to the conference bridge, via which other client device **110** is to be connected to the conference bridge. Additionally, or alternatively, VCCS **130** may allocate additional bandwidth and/or processing resources, to the conference bridge, to permit the other client device **110** to communicate via the conference bridge. Based on the allocation of the other resources to the conference bridge, VCCS **130** may establish a connection, via the other port, between the other client device **110** and the conference bridge.

In one example, VCCS **130** may determine, based on the client information, that the other client device **110** is a particular type of client device **110** (e.g., a CTS and/or some other type of client device **110**) and/or is communicating via a particular type of client server **120** (e.g., a CUCM and/or some other type of client server). Based on the determination that the other client device **110** is the particular type of client device **110** and/or is communicating via the particular type of client server **120**, VCCS **130** may retrieve, from a memory associated with VCCS **130**, a signaling template. The signaling template may permit VCCS **130** to communicate with a variety of types of client devices **110** and/or client servers **120** using a variety of transport and/or signaling protocols (e.g., a streaming protocol, an IP, a TIP, etc.). VCCS **130** may use the signaling template to establish the connection between the other client device **110** and the conference bridge so that the other client device **110** is able to transmit traffic to and/or receive traffic from client device **110** via the conference bridge.

A system and/or method, described herein, may allow a VCCS, originally designed to enable a client device associated with an enterprise to hold video conferences, to set up and/or execute multiple distinct video conferences that can be accessed by client devices associated with multiple different enterprises. Each distinct video conference may allow users, of respective client devices, to interact in a secure manner and/or from potentially geographically distributed locations. The VCCS may establish each of the video conferences, using secure connections, based on respective client information that specifies access control, call routing, communication and/or security protocols, etc. for each of the video conferences. The VCCS may process information associated with video conferences so that information, associated with one video conference cannot be accessed via another video conference. Establishing multiple video conferences may enable the VCCS to provision a video conferencing service to client devices associated with multiple different enterprises, which may allow users, of the client devices, to hold meetings without the enterprises incurring the expense associated with users traveling to meetings or purchasing their own equipment.

A system and/or method may allow the VCCS to dynamically determine whether to permit a client device to access a virtual environment based on client information. The VCCS may, based on the client information, block a user from setting up a video conference that provides access to a user that is not authorized, by the client information, to access the video conference. A system and/or method may allow the VCCS to dynamically set up a video conference, on a just-in-time basis, if the client information permits the user to set up the video conference.

The foregoing description provides illustration and description, but is not intended to be exhaustive or to limit the implementations to the precise form disclosed. Modifications

and variations are possible in light of the above disclosure or may be acquired from practice of the implementations.

While series of blocks have been described with regard to FIGS. **5-7** and **9**, the order of the blocks may be modified in other implementations. Further, non-dependent blocks may be performed in parallel.

It will be apparent that systems and/or methods, as described above, may be implemented in many different forms of software, firmware, and hardware in the implementations illustrated in the figures. The actual software code or specialized control hardware used to implement these systems and/or methods is not limiting of the implementations. Thus, the operation and behavior of the systems and/or methods were described without reference to the specific software code—it being understood that software and control hardware can be designed to implement the systems and/or methods based on the description herein.

Further, certain portions, described above, may be implemented as a component or logic that performs one or more functions. A component or logic, as used herein, may include hardware, such as a processor, an application-specific integrated circuit (ASIC), or a field-programmable gate array (FPGA), or a combination of hardware and software (e.g., a processor executing software).

It should be emphasized that the term "comprises/comprising," when used in this specification, is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure of the possible implementations. In fact, many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. Although each dependent claim listed below may directly depend on only one other claim, the disclosure of the implementations includes each dependent claim in combination with every other claim in the claim set.

No element, act, or instruction used in the present application should be construed as critical or essential to the implementations unless explicitly described as such. Also, as used herein, the article "a" is intended to include one or more items. Where only one item is intended, the term "one" or similar language is used. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed is:

1. A method comprising:

receiving, by a device and from a first client device, a request to initiate a video conference call between the first client device and a second client device,

the first client device being associated with a first enterprise, and

the second client device being associated with a second enterprise that is different than the first enterprise;

obtaining, by the device and based on the request, first client information associated with the first client device and second client information associated with the second client device;

establishing, by the device, a conference bridge, associated with the video conference call, when it is determined, based on the first client information, that the first client device is permitted to attend the video conference call,

the first client device being permitted to attend the video conference call when a first privilege level specified by the first client information satisfies a threshold and when the first client information indicates that the first client device is capable of communicating based on an encryption scheme;

connecting, by the device and based on determining that the first client device is permitted to attend the video conference call, the first client device to the conference bridge;

determining, by the device and based on the second client information, that the second client device is permitted to attend the video conference call,

the second client device being permitted to attend the video conference call when a second privilege level specified by the second client information satisfies the threshold and when the second client information indicates that the second client device is capable of communicating based on the encryption scheme; and

connecting, by the device and based on determining that the second client device is permitted to attend the video conference call, the second client device to the conference bridge.

2. The method of claim **1**, further comprising:

transmitting, when it is determined, based on the first client information, that the first client device is not permitted to attend the video conference call, a notification to the first client device indicating that the first client device is not authorized to attend the video conference call.

3. The method of claim **1**, further comprising:

associating resources with the conference bridge,

the resources allowing the first client device to be connected to or to communicate via the conference bridge,

where, when connecting the first client device to the conference bridge, the method includes:

connecting, based on associating resources with the conference bridge, the first client device to the conference bridge.

4. The method of claim **1**, further comprising:

generating, when it is determined, based on the first client information, that the first client device is permitted to attend the video conference call, conference information; and

transmitting, when it is determined, based on the first client information, that the first client device is permitted to attend the video conference call, a notification to the first client device indicating that the first client device is authorized to attend the video conference call,

where, when establishing the conference bridge, the method includes:

establishing, based on generating the conference information, the conference bridge.

5. The method of claim **1**, further comprising:

receiving, from at least one of the first client device or the second client device, a request to access the video conference call;

determining, based on receiving the request from the at least one of the first client device or the second client device, if the at least one of the first client device or the second client device is authorized to access the video conference call; and

establishing, when the at least one of the first client device or the second client device is permitted to attend the video conference call and authorized to access the video conference call, a connection between the at least one of the first client device or the second client device and the conference bridge.

6. The method of claim 5, further comprising:

transmitting, when the at least one of the first client device or the second client device is not authorized to access the video conference call, a notification to the at least one of the first client device or the second client device indicating that the at least one of the first client device or the second client device is not authorized to access the video conference call.

7. The method of claim 5, further comprising:

identifying, based on information associated with the request to access the video conference call, information associated with the conference bridge; and

identifying, based on the information associated with the request to access the video conference call, information associated with the at least one of the first client device or the second client device,

where, when determining if the at least one of the first client device or the second client device is authorized to access the video conference call, the method includes:

determining if the at least one of the first client device or the second client device is authorized to access the video conference call based on the information associated with the conference bridge and the identified information associated with the at least one of the first client device or the second client device.

8. A device comprising:

a memory to store instructions; and

a processor to execute the instructions to:

receive, from a first client device, a request to initiate a video conference call between the first client device and a second client device,

the first client device being associated with a first enterprise, and

the second client device being associated with a second enterprise that is different than the first enterprise;

obtain, based on the request to initiate the video conference call, first client information associated with the first client device;

obtain, based on the request to initiate the video conference call, second client information associated with the second client device;

establish the video conference call when it is determined, based on the first client information, that the first client device is permitted to set up the video conference call,

the first client device being permitted to set up the video conference call when a first privilege level specified by the first client information satisfies a threshold and when the first client information indicates that the first client device is capable of communicating based on an encryption scheme,

the processor, when establishing the video conference call, being to:

generate conference information, associated with the video conference call, based on a determination that the first client device is authorized to set up the video conference call; and

establish, based on the generated conference information, the video conference call;

determine, based on the second client information, that the second client device is permitted to attend the video conference call,

the second client device being permitted to attend the video conference call when a second privilege level specified by the second client information satisfies the threshold and when the second client information indicates that the second client device is capable of communicating based on the encryption scheme; and

cause, based on determining that the second client device is permitted to attend the video conference call, the second client device to be connected the video conference call.

9. The device of claim 8, where the processor is further to:

identify a third client device to attend the video conference call;

determine, based on the first client information, whether the third client device is permitted to access the video conference call; and

transmit, when it is determined, based on the first client information, that the third client device is not permitted to access the video conference call, a notification that the third client device is not authorized to access the video conference call.

10. The device of claim 8, where the processor is further to:

obtain, from the first client device and based on the request from the first client device, set up information associated with the video conference call;

associate, based on the set up information, resources with a conference bridge associated with the video conference call; and

cause, based on associating the resources with the conference bridge, the first client device to be connected to the conference bridge.

11. The device of claim 10, where the set up information includes an indication that the video conference call is to be established on a just-in-time basis.

12. The device of claim 10, where the set up information includes information associated with a quantity of bandwidth associated with the first client device.

13. The device of claim 10, where the processor is further to:

receive, from a third client device, a request to access the video conference call;

determine, based on the first client information, that the third client device is permitted to access the video conference call;

associate, based on determining that the third client device is permitted to access the video conference call, additional resources with the conference bridge; and

connect, based on associating the additional resources with the conference bridge, the third client device to the conference bridge.

14. The device of claim 8, where the processor is further to:

communicate, based on an instruction to obtain the first client information, with another device to obtain the first client information; and

store the first client information.

15. A system comprising:

one or more devices to:

receive, from a first client device, a request to set up a video conference call,

the request identifying a second client device to access the video conference call,

the first client device being associated with a first enterprise, and

the second client device being associated with a second enterprise that is different than the first enterprise;

obtain, based on the request, first client information associated with the first client device and second client information associated with the second client device;

establish, when it is determined, based on the first client information, that the first client device is authorized to set up the video conference call, a conference bridge associated with the video conference call,

the first client device being authorized to set up the video conference call when a first privilege level specified by the first client information satisfies a threshold and when the first client information indicates that the first client device is capable of communicating based on an encryption scheme;

connect the first client device to the conference bridge;

receive, from the second client device, a request to access the video conference call,

the second client device being different than the first client device;

determine, based on the request to access the video conference call and based on the second client information, that the second client device is permitted to access the video conference call,

the second client device being permitted to access the video conference call when a second privilege level specified by the second client information satisfies the threshold and when the second client information indicates that the second client device is capable of communicating based on the encryption scheme;

associate, based on determining that second client device is permitted to access the video conference call, resources with the conference bridge that allow the second client device to communicate with the conference bridge; and

connect, based on associating the resources with the conference bridge that allow the second client device to communicate with the conference bridge, the second client device to the conference bridge.

16. The system of claim **15**, where the one or more devices, when establishing the conference bridge, are to:

transmit, to the second client device, a network address that allows the second client device to communicate with the first client device.

17. The system of claim **16**, where the second client device communicates with the first client device via a virtual environment.

18. The system of claim **15**, where the one or more devices, when connecting the first client device to the conference bridge, are to:

establish a connection with the first client device using a protocol that prevents traffic, associated with the video conference call, from being transmitted to a third client device that is connected to another conference bridge.

19. The system of claim **15**, where

the one or more devices are further to:

identify, based on the request to access the video conference call, a first address associated with the second client device and a second address associated with the video conference call; and

determine if the first address is stored in a list of first addresses that correspond to one or more client devices that are authorized to set up or access the video conference call, and

the one or more devices, when connecting the second client device to the conference bridge, are to:

connect the second client device to the conference bridge when first address is stored in the list of first addresses.

20. The system of claim **19**, where

the one or more devices are further to:

determine if the second address is stored in a list of second addresses that correspond to one or more client devices that are authorized to set up or access the video conference call, and

the one or more devices, when connecting the second client device to the conference bridge, are to:

connect the second client device to the conference bridge when second address is stored in the list of second addresses.

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